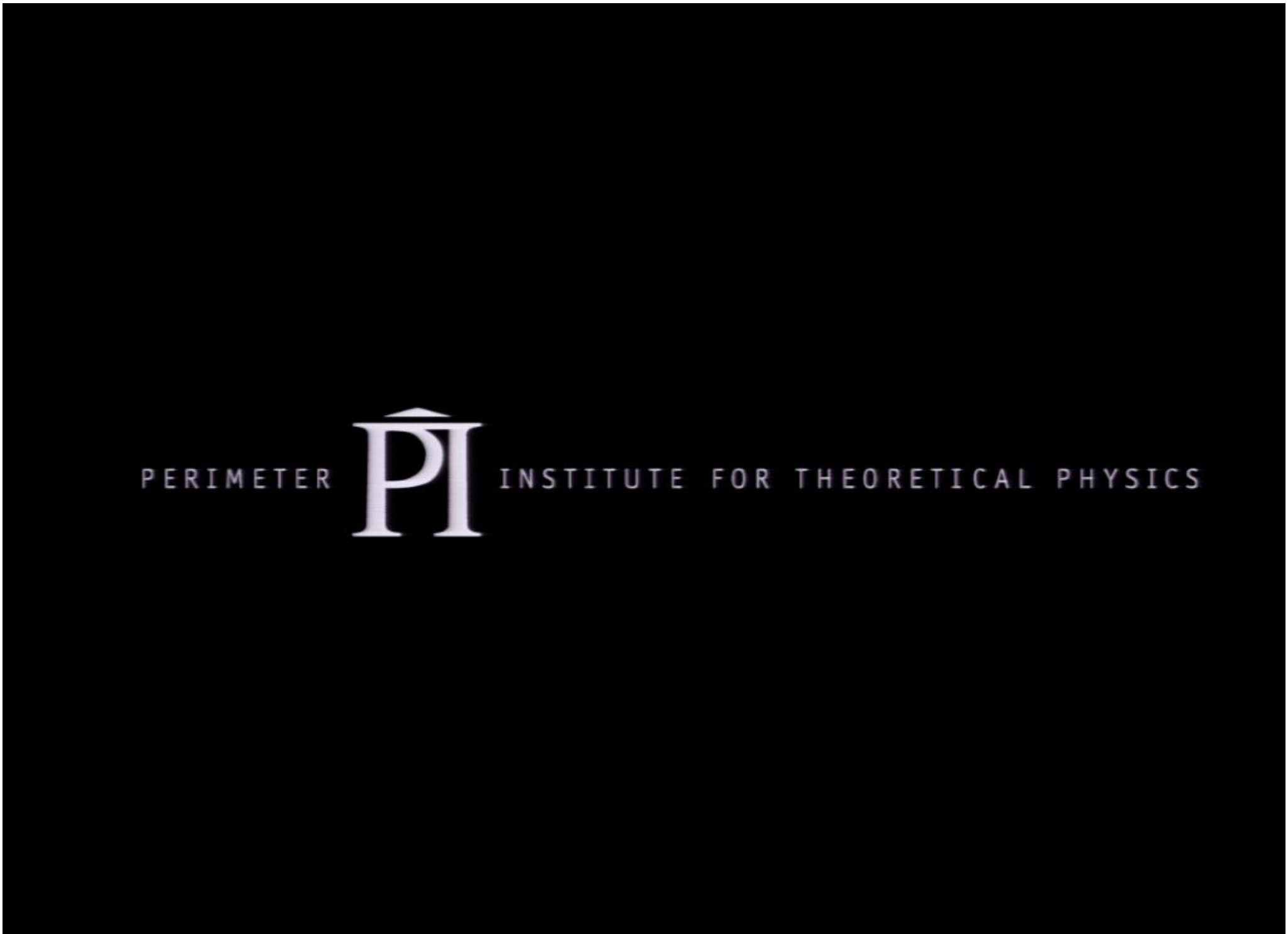
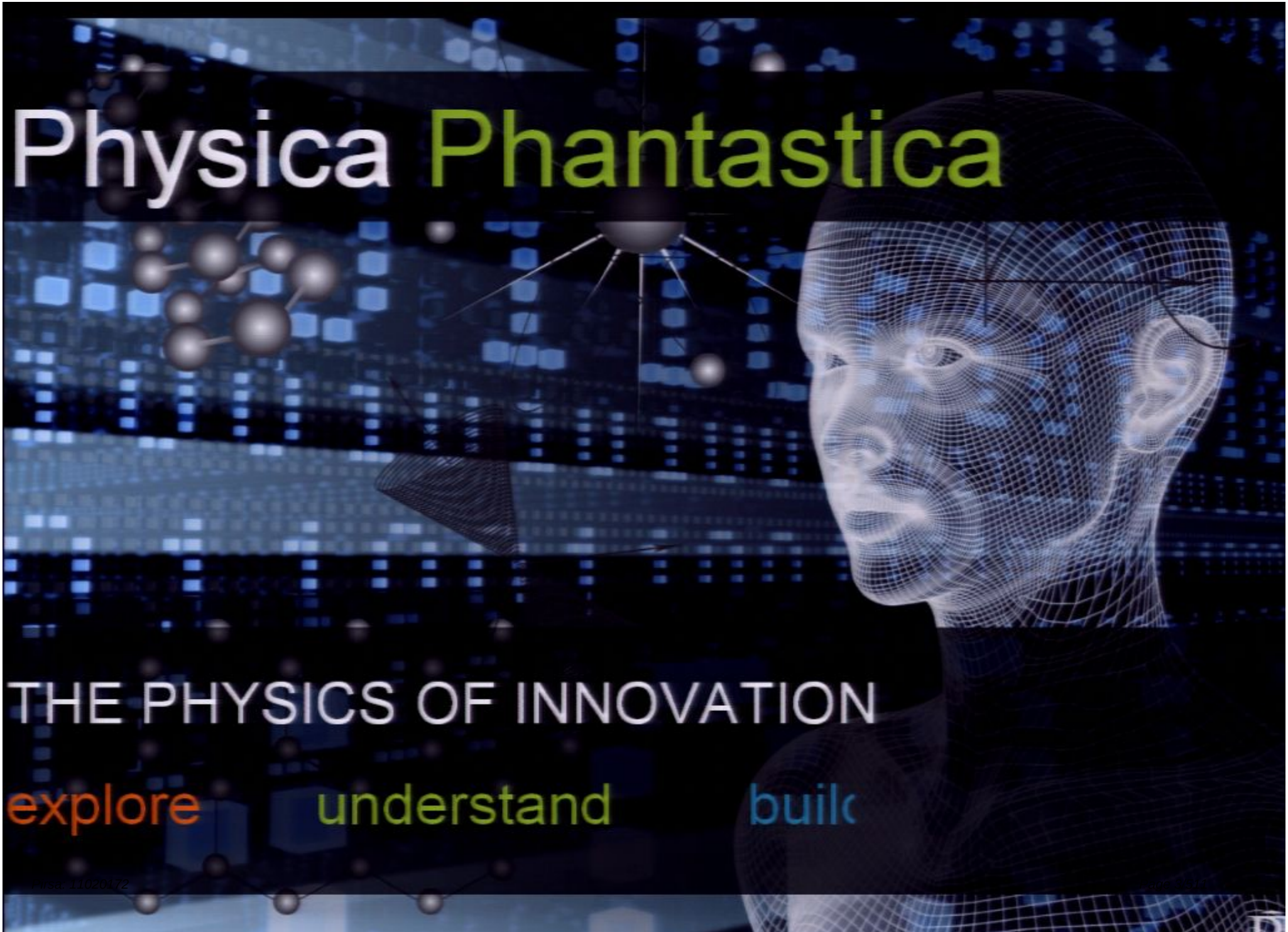
Title: Physics of Innovation - 1b

Date: Feb 26, 2011 10:30 AM

URL: http://www.pirsa.org/11020172

Abstract:

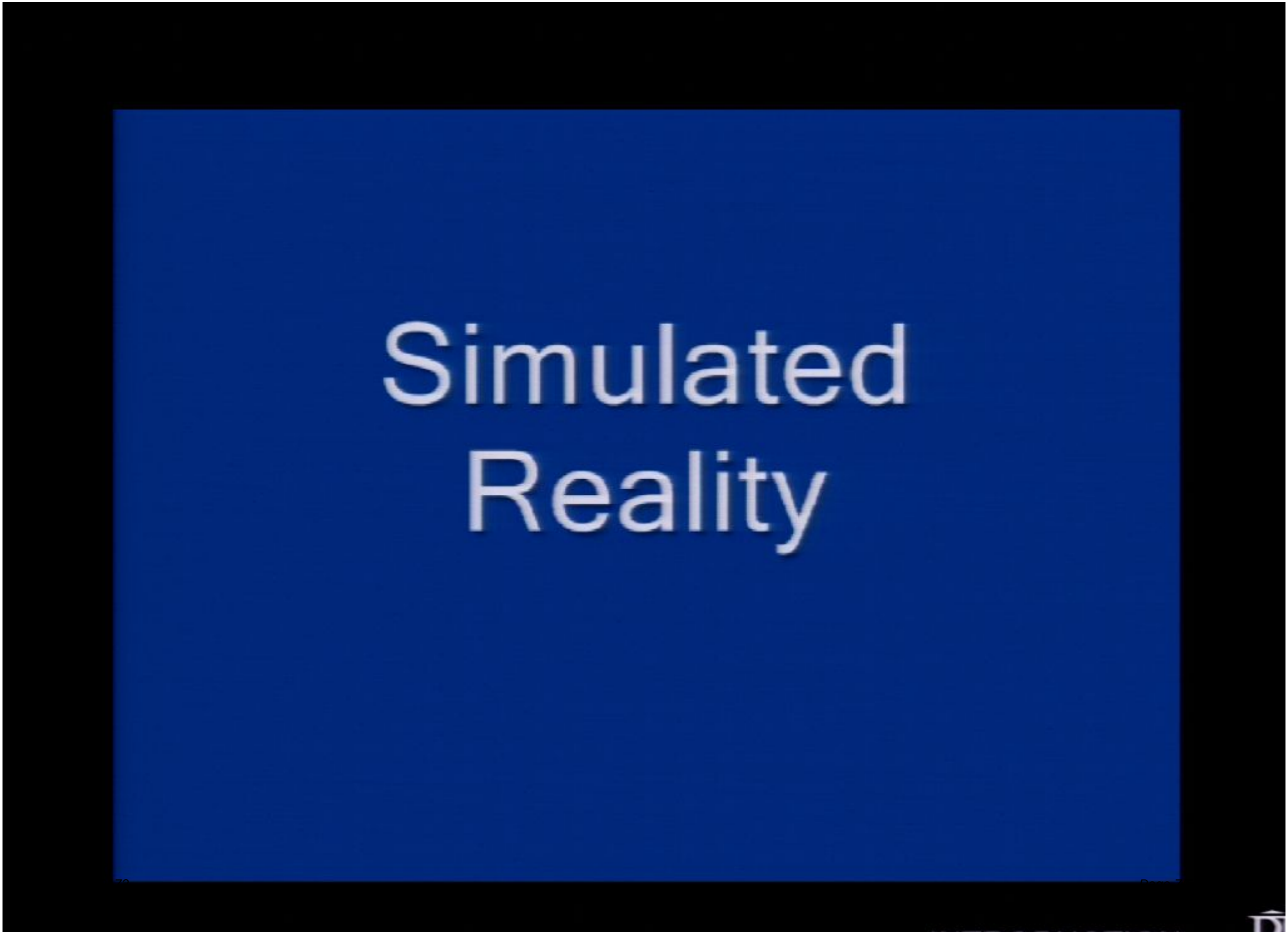

PERIMETER
INSTITUTE FOR THEORETICAL PHYSICS

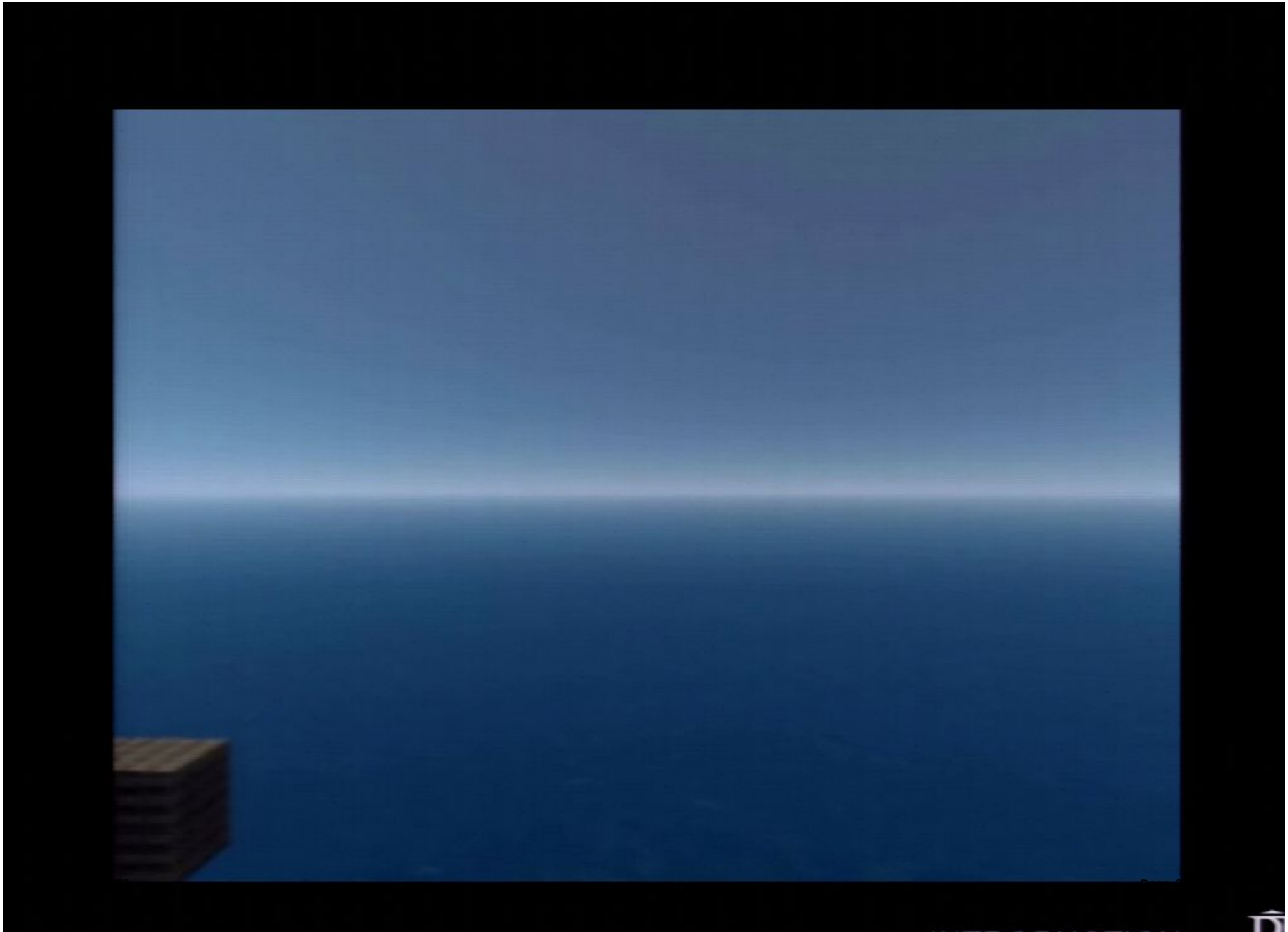

Physica Phantastica
THE PHYSICS OF INNOVATION
explore
understand
build

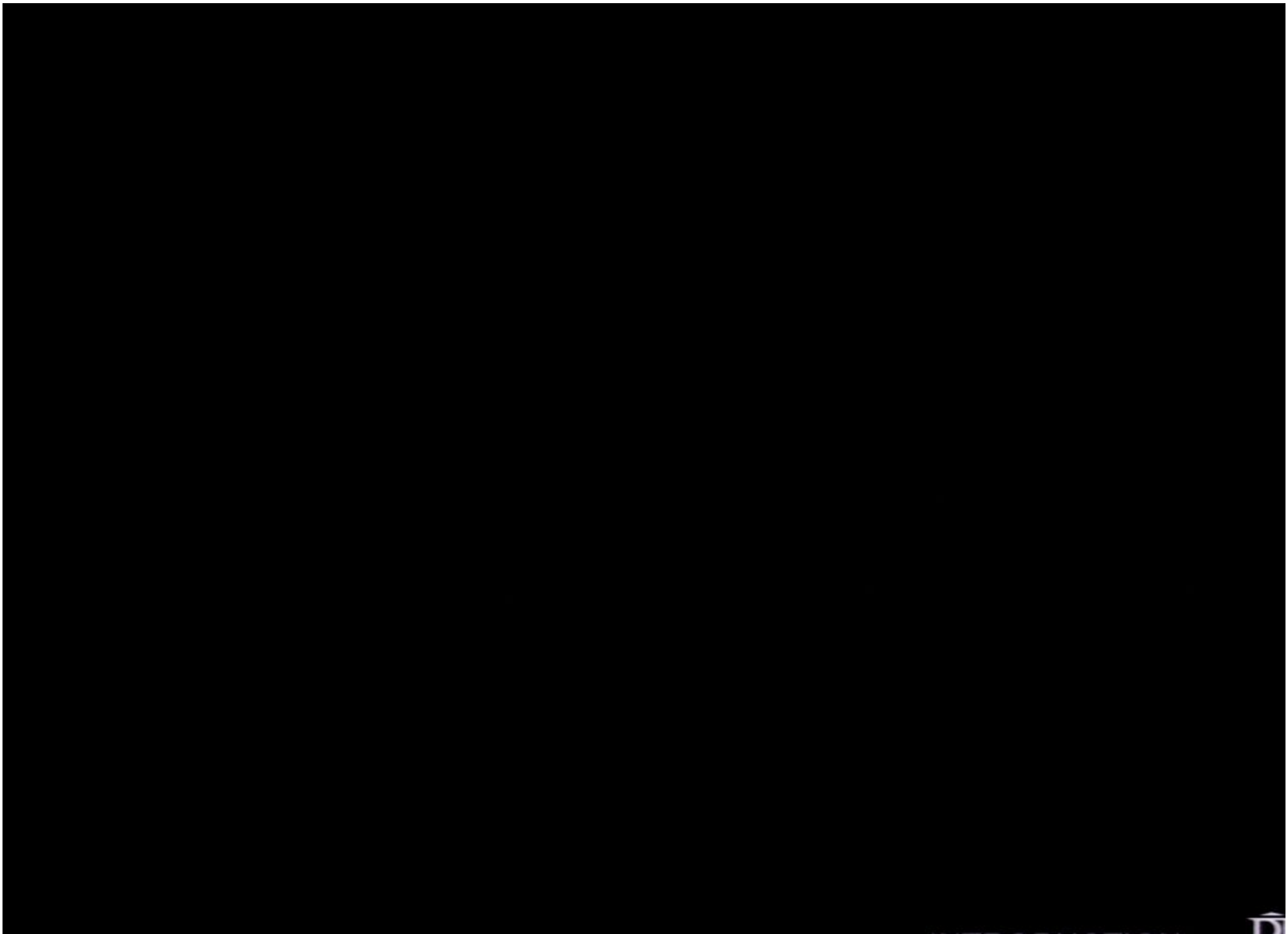
THE PHYSICS OF INNOVATION
INTRODUCTION

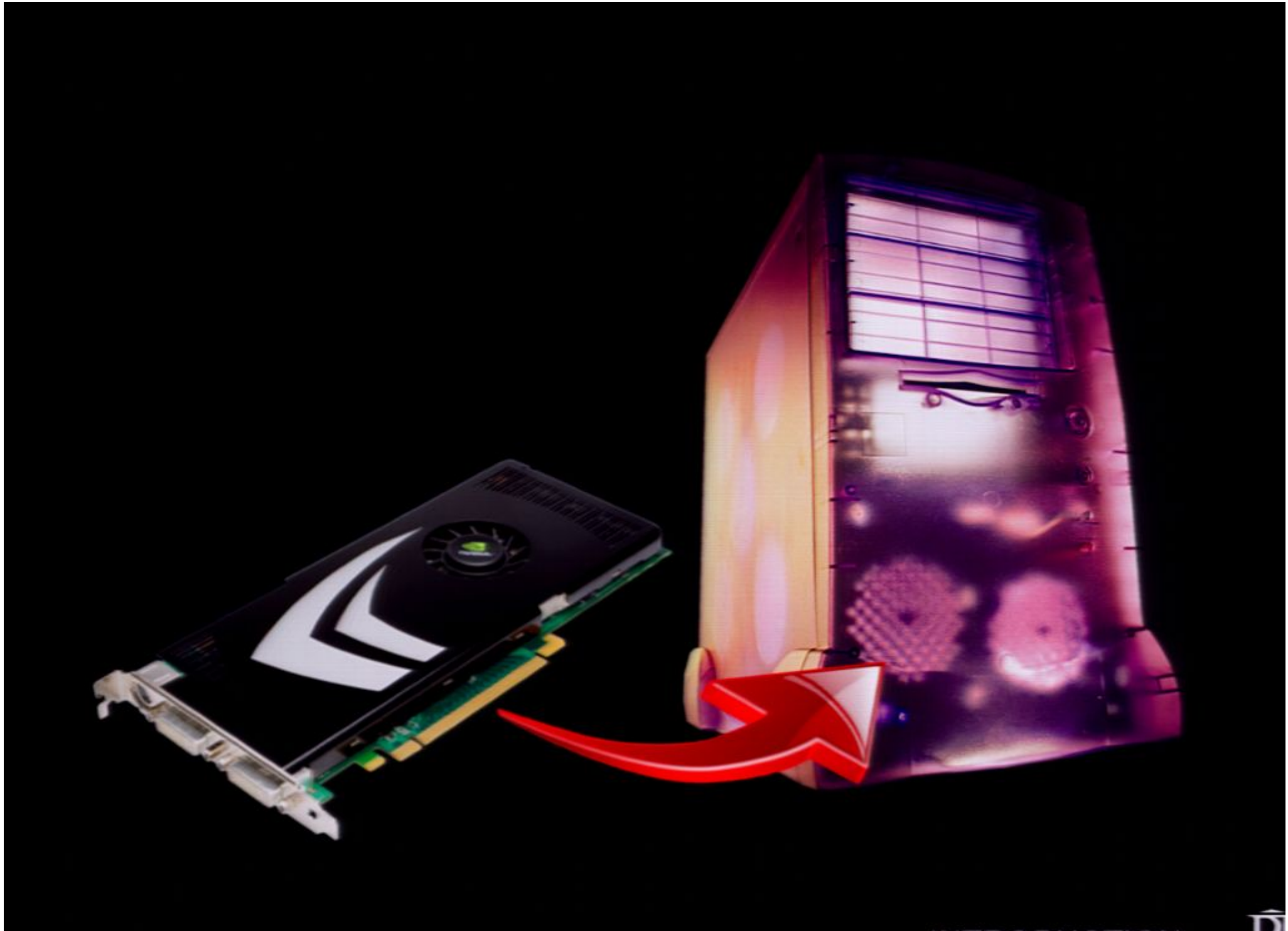
HEADGEAR

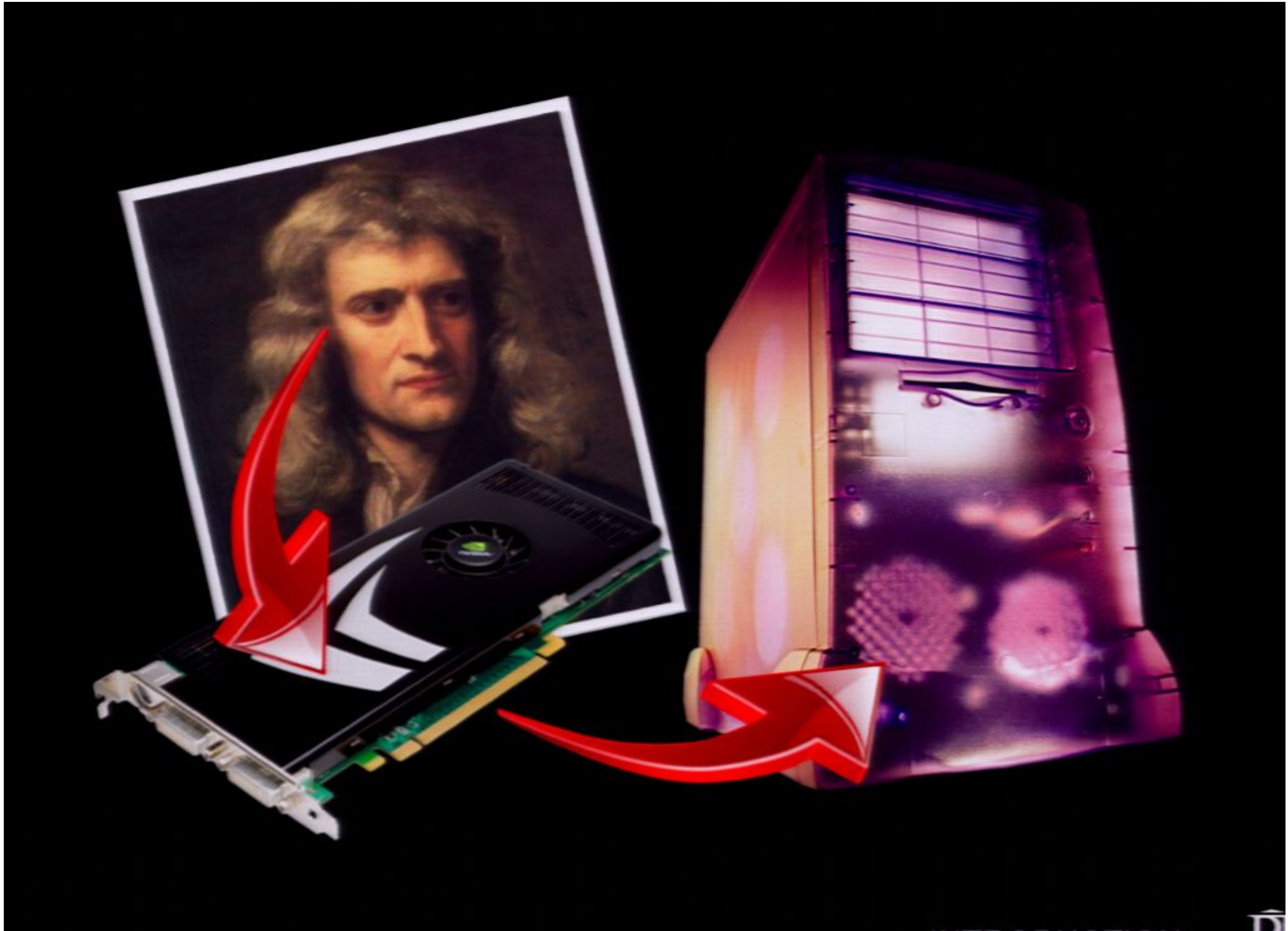
what is reality?


Simulated
Reality

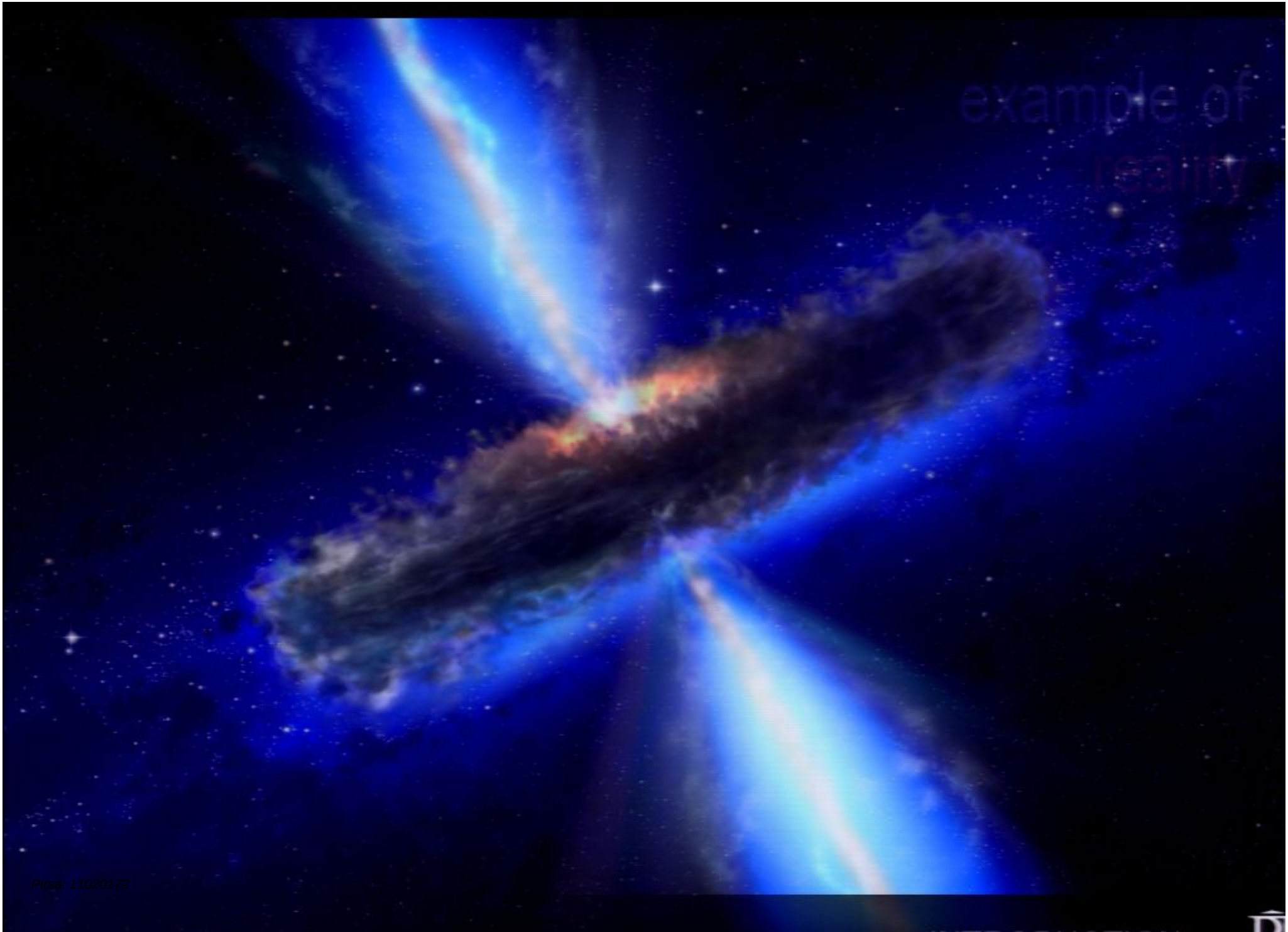








reality goes deeper


example of
reality
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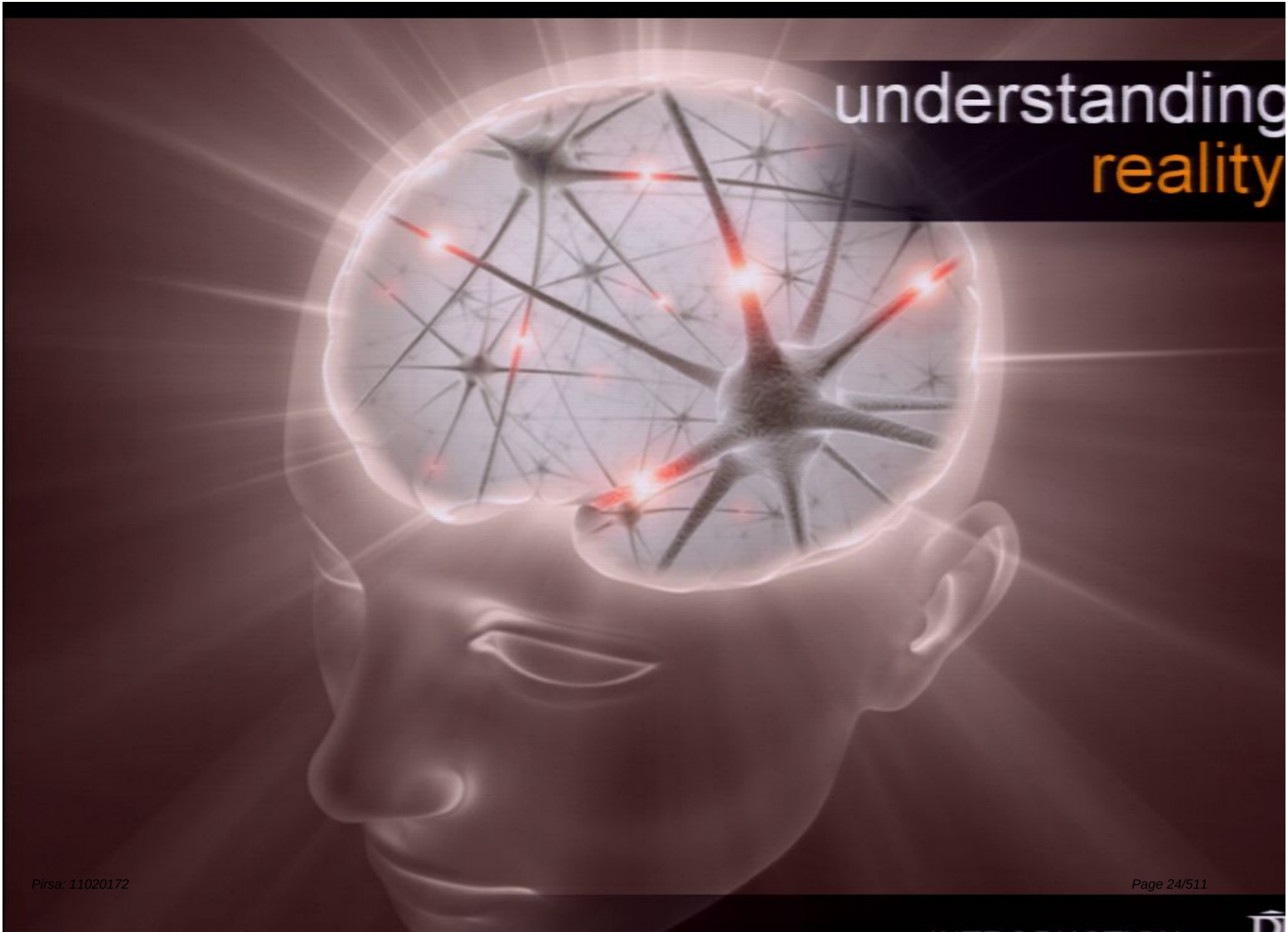
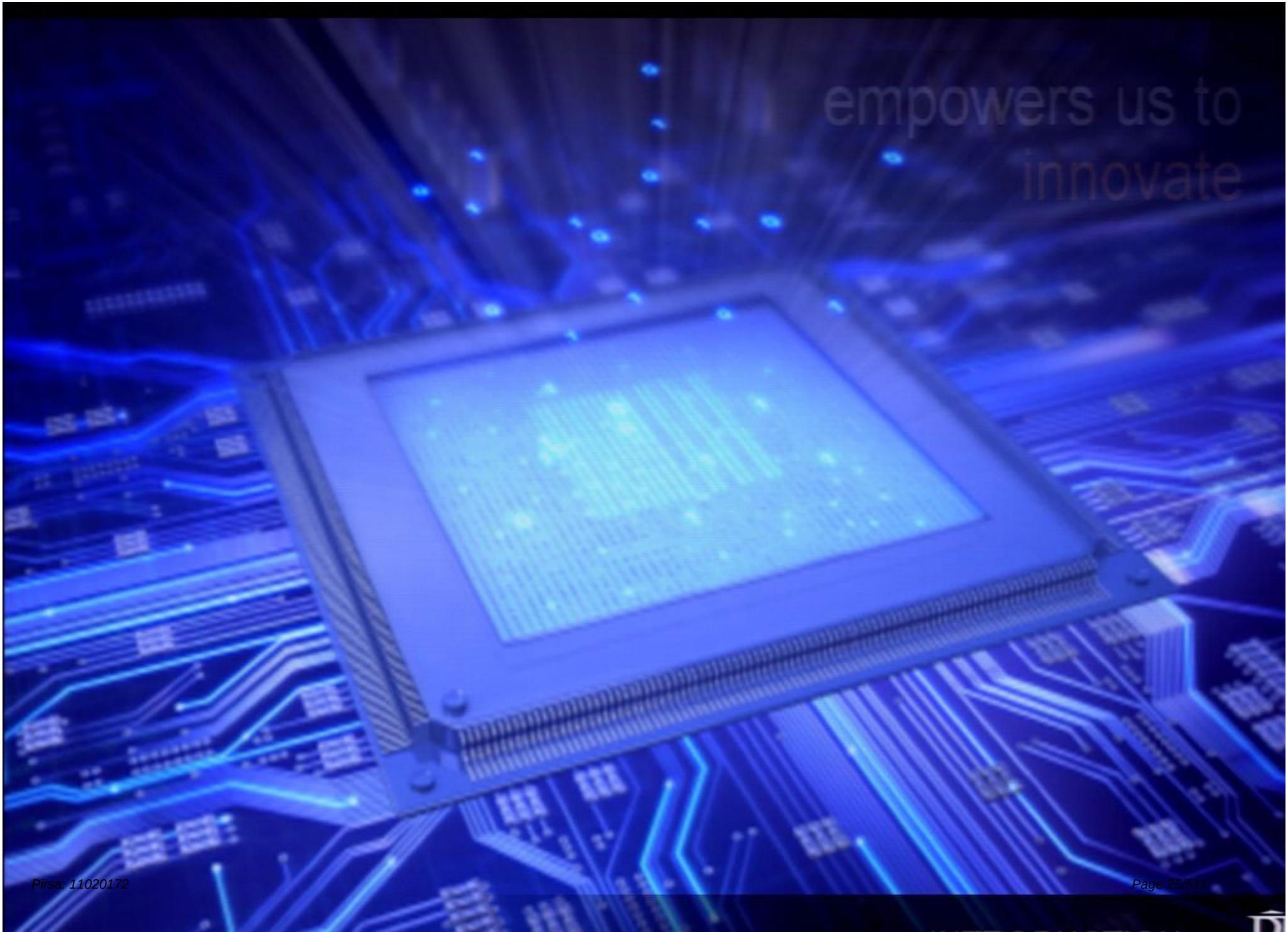
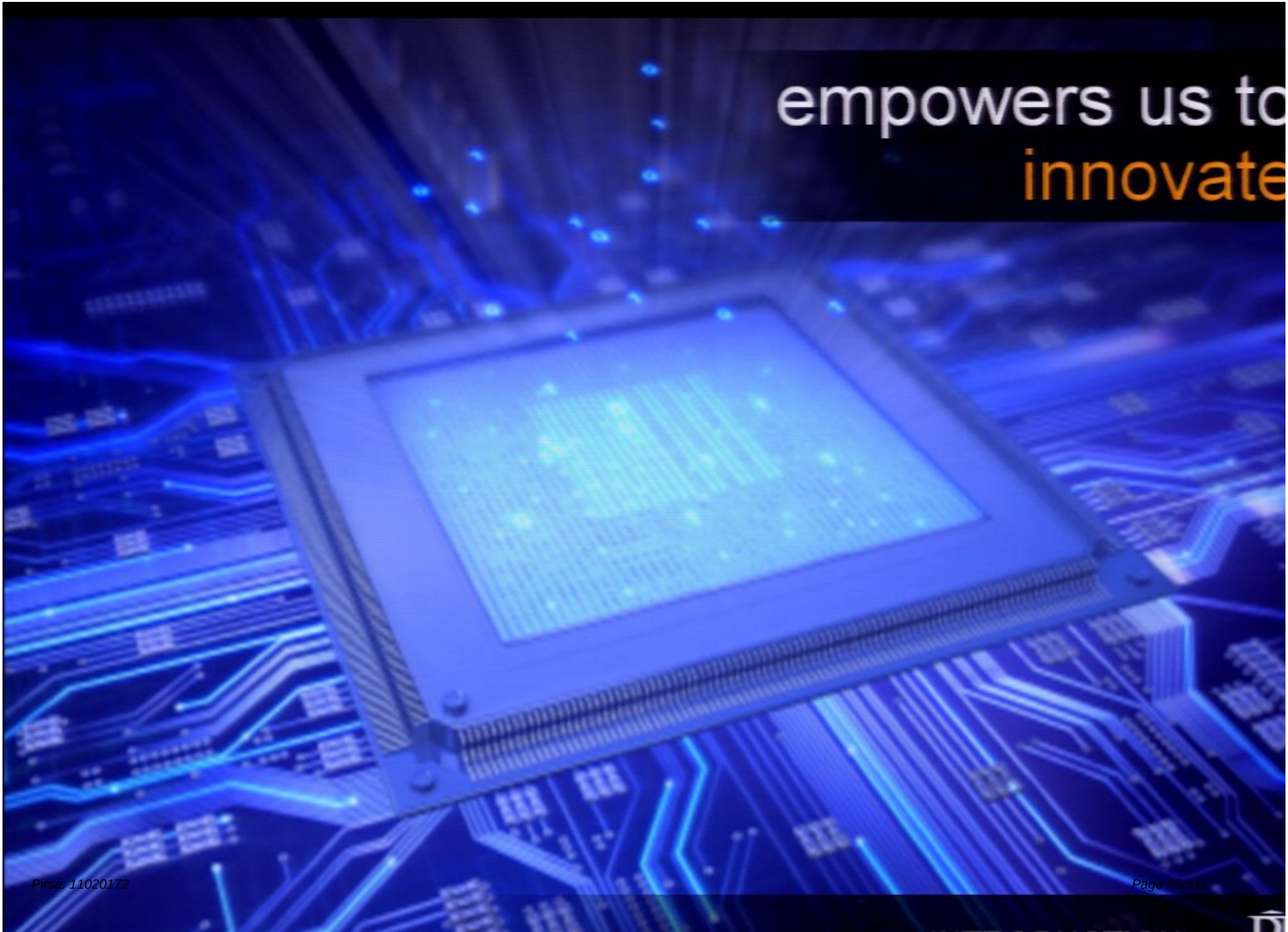
understanding
reality


understanding
reality


empowers us to
innovate


empowers us to
innovate

the physics of innovation:

the physics of innovation:

explore mystery

the physics of innovation:

explore mystery

understand reality

the physics of innovation:

explore mystery

understand reality

build cool stuff

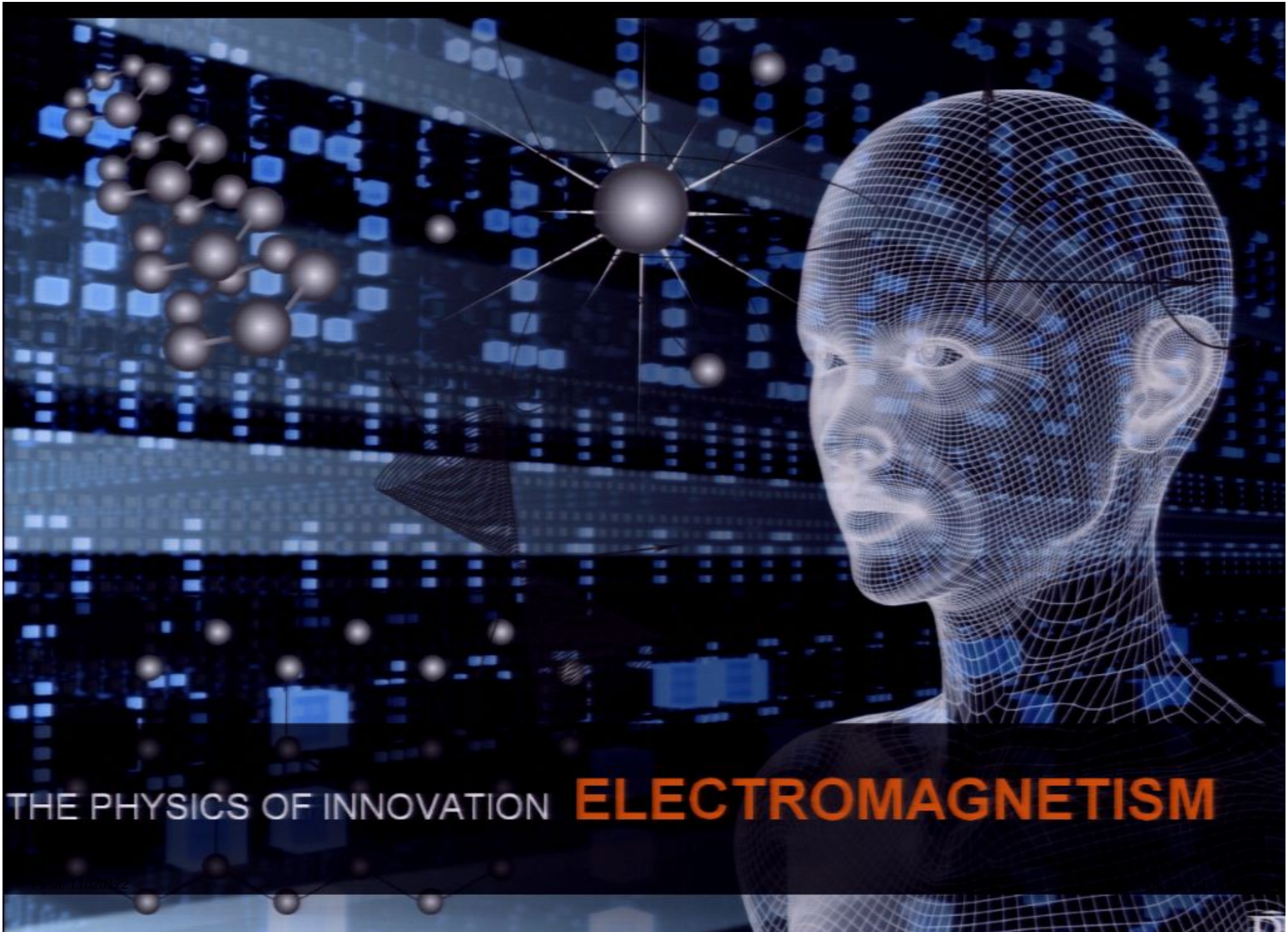
4 ideas that changed the world

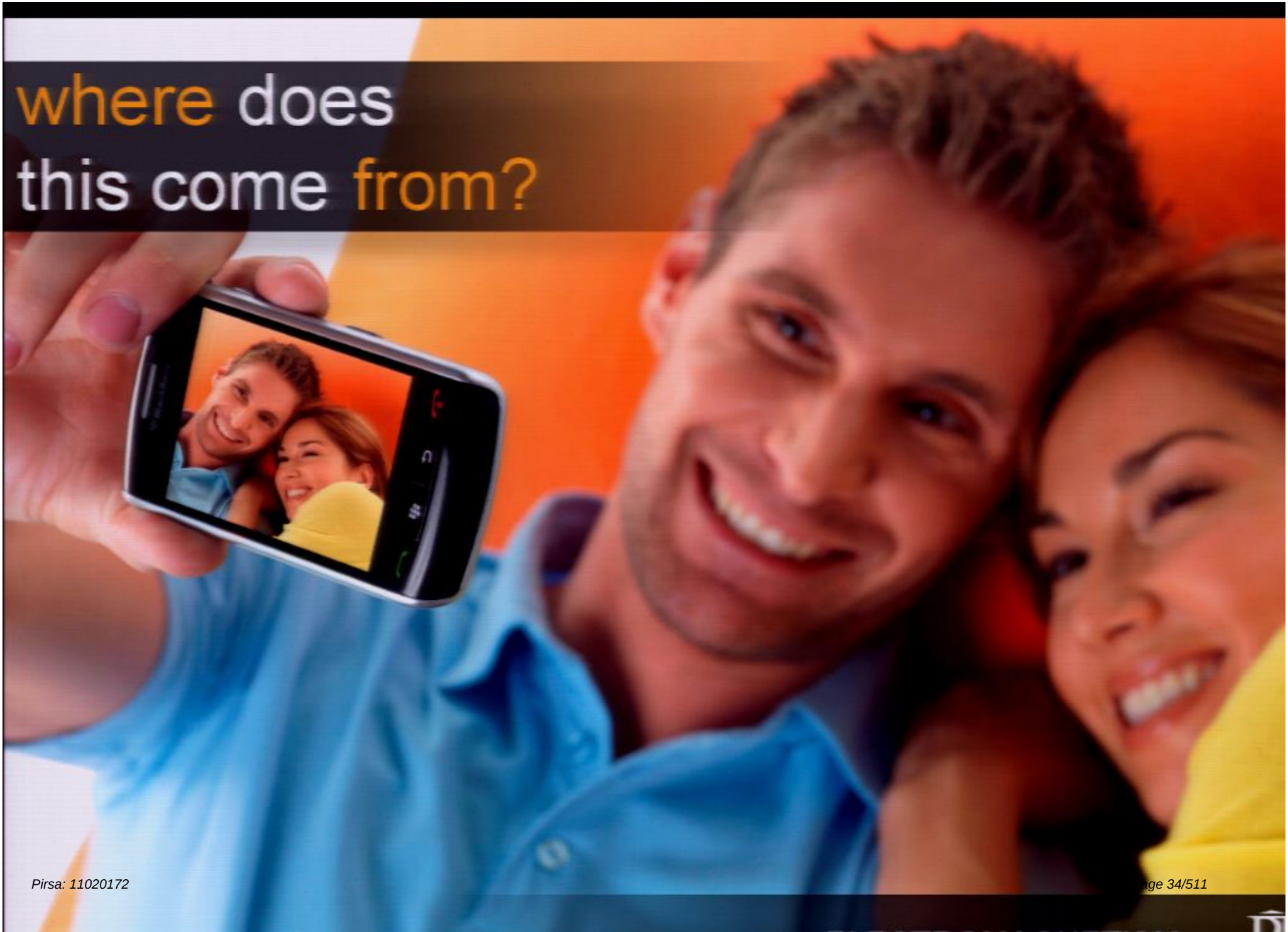
electromagnetism

quantum

special relativity

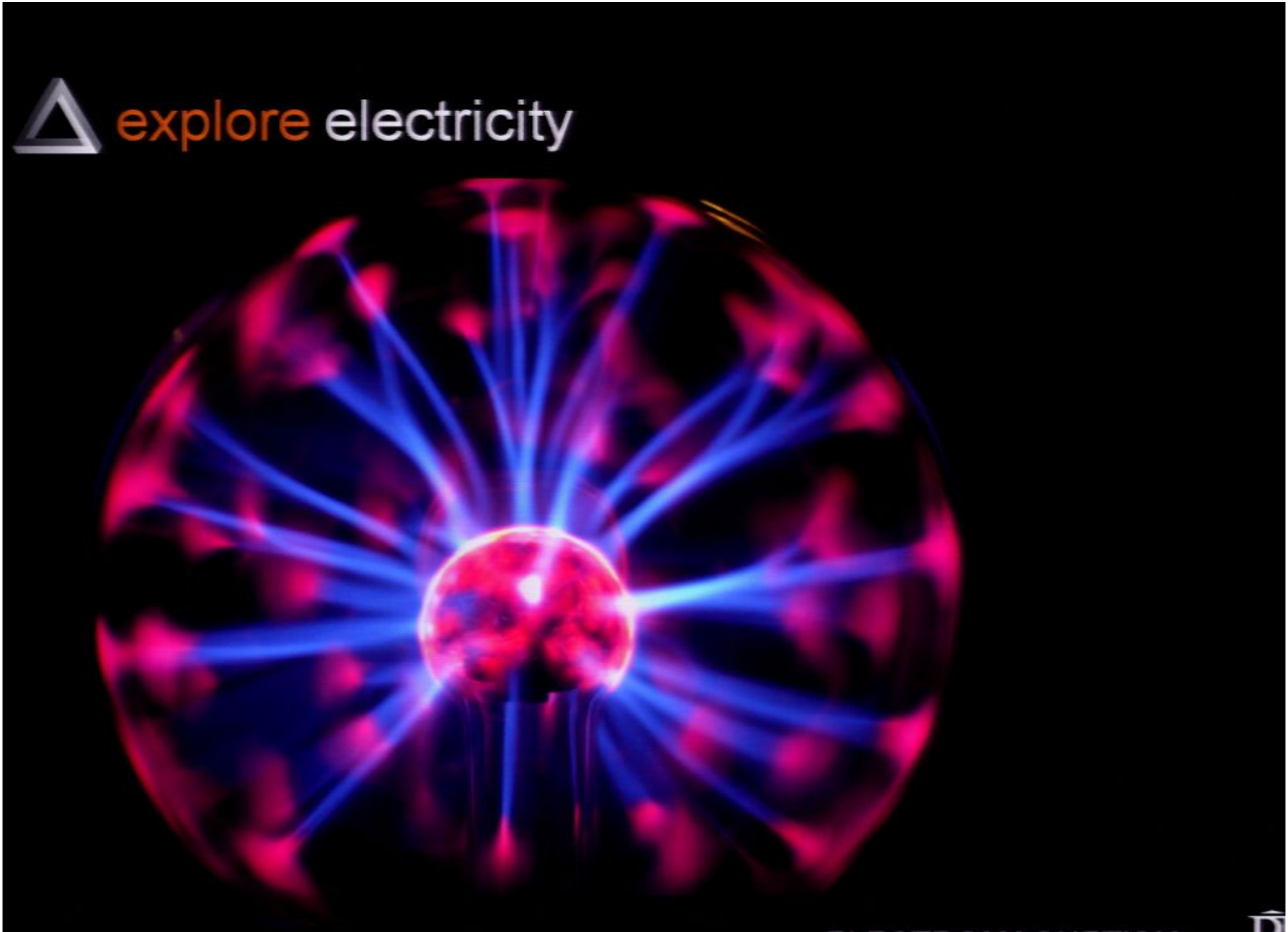
general relativity


THE PHYSICS OF INNOVATION
ELECTROMAGNETISM


where does
this come from?

explore mysteries

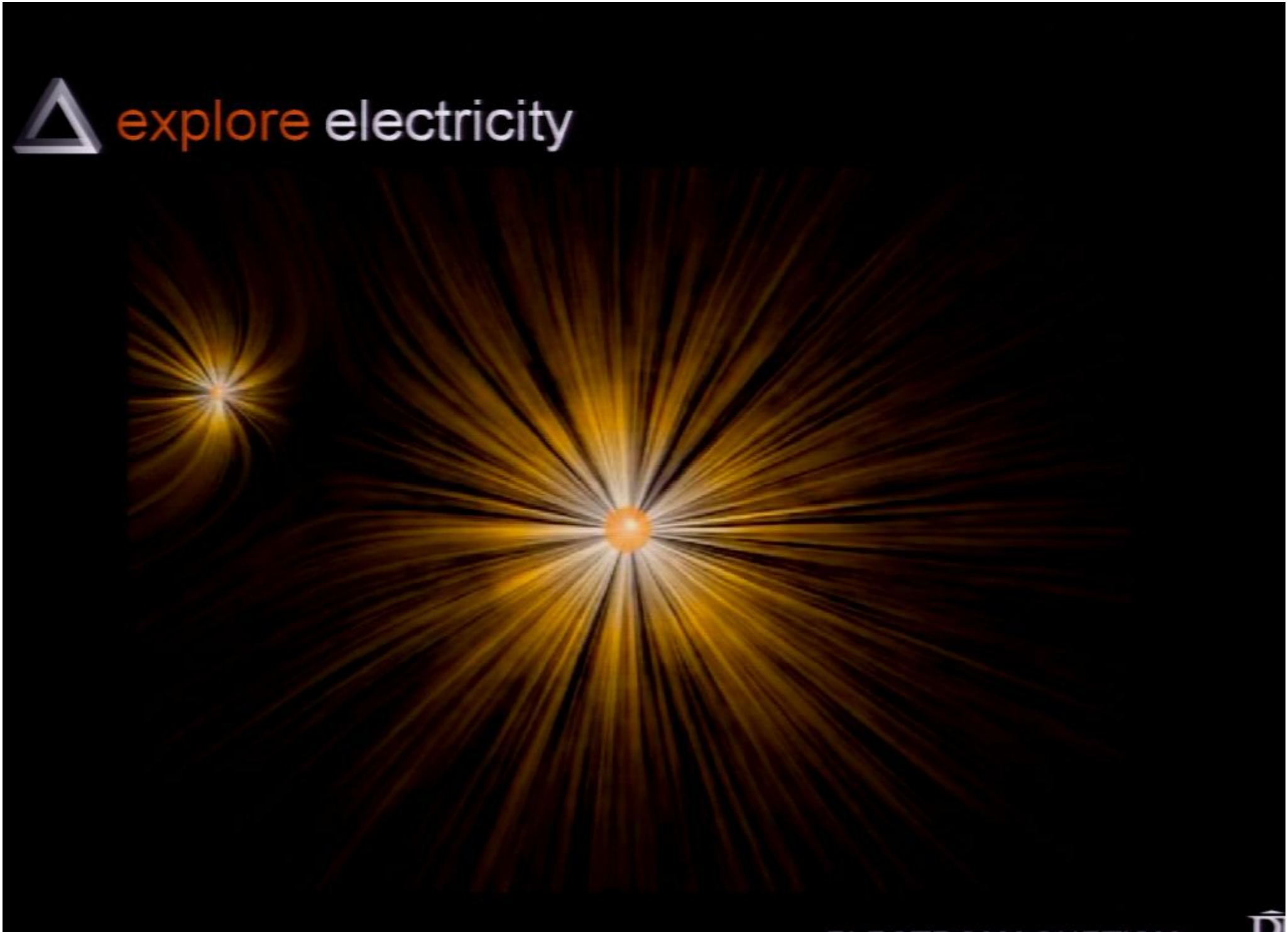
electricity & magnetism


explore electricity

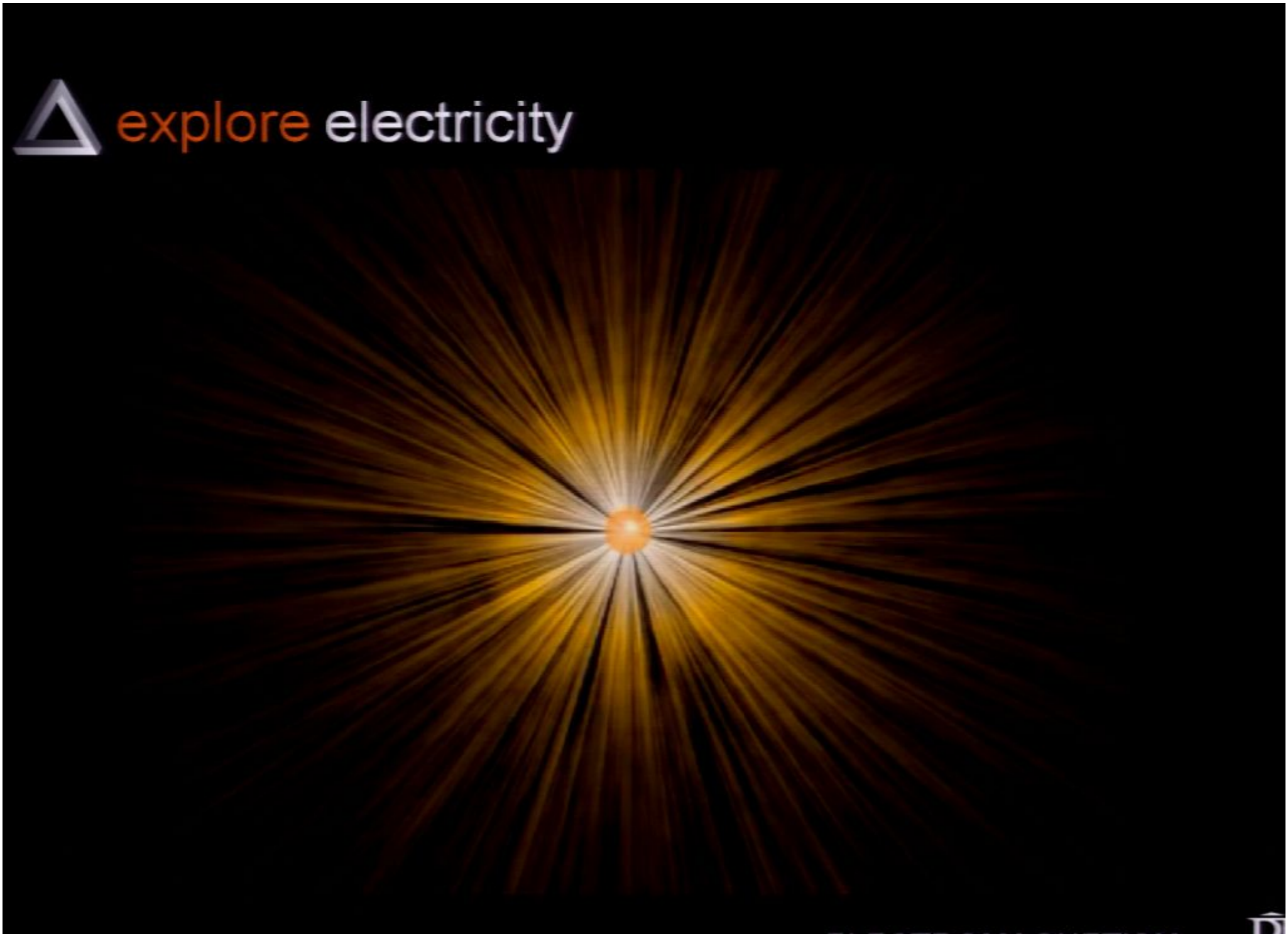
explore electricity

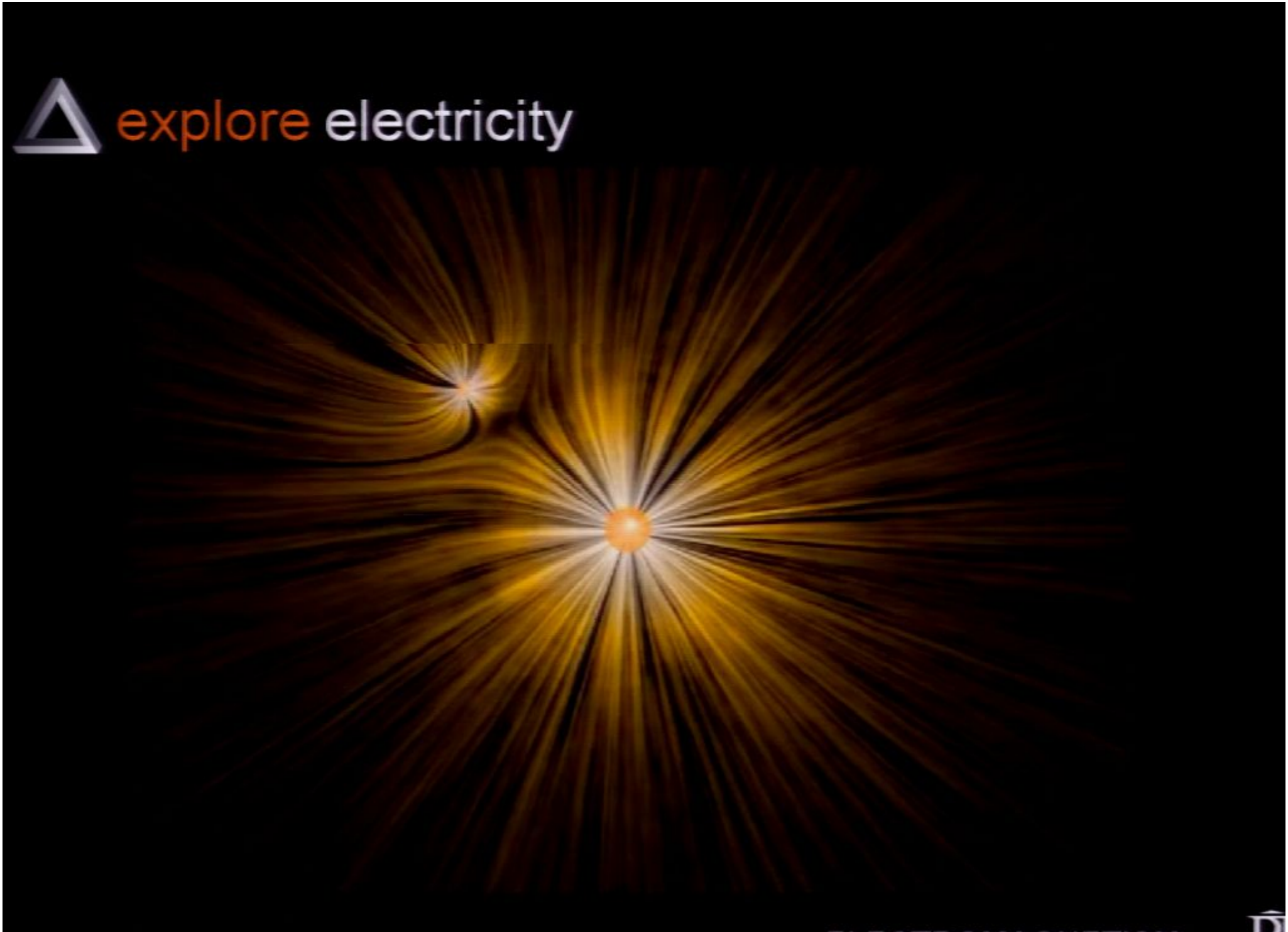
explore electricity

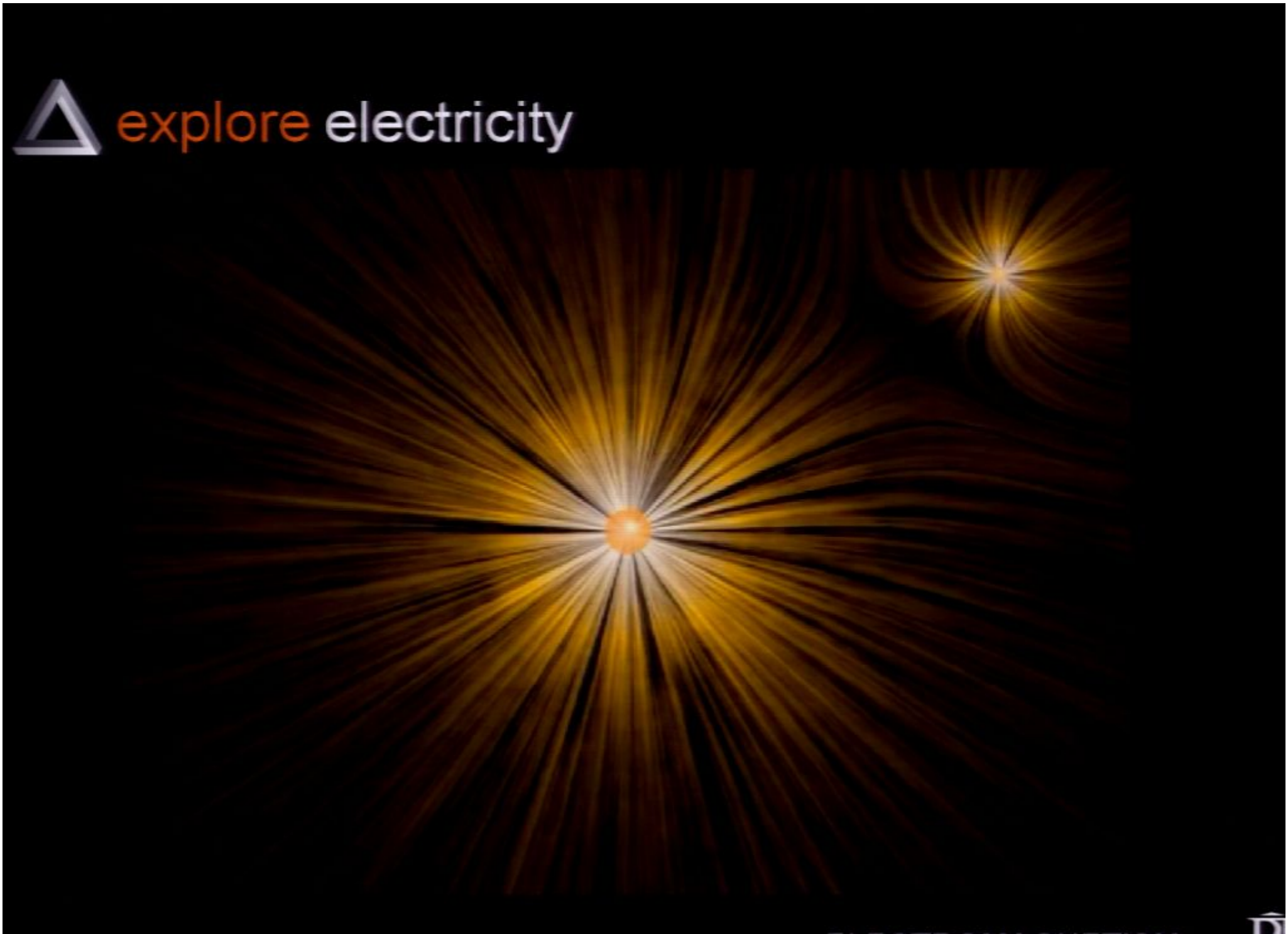
Simulated
Reality


explore electricity

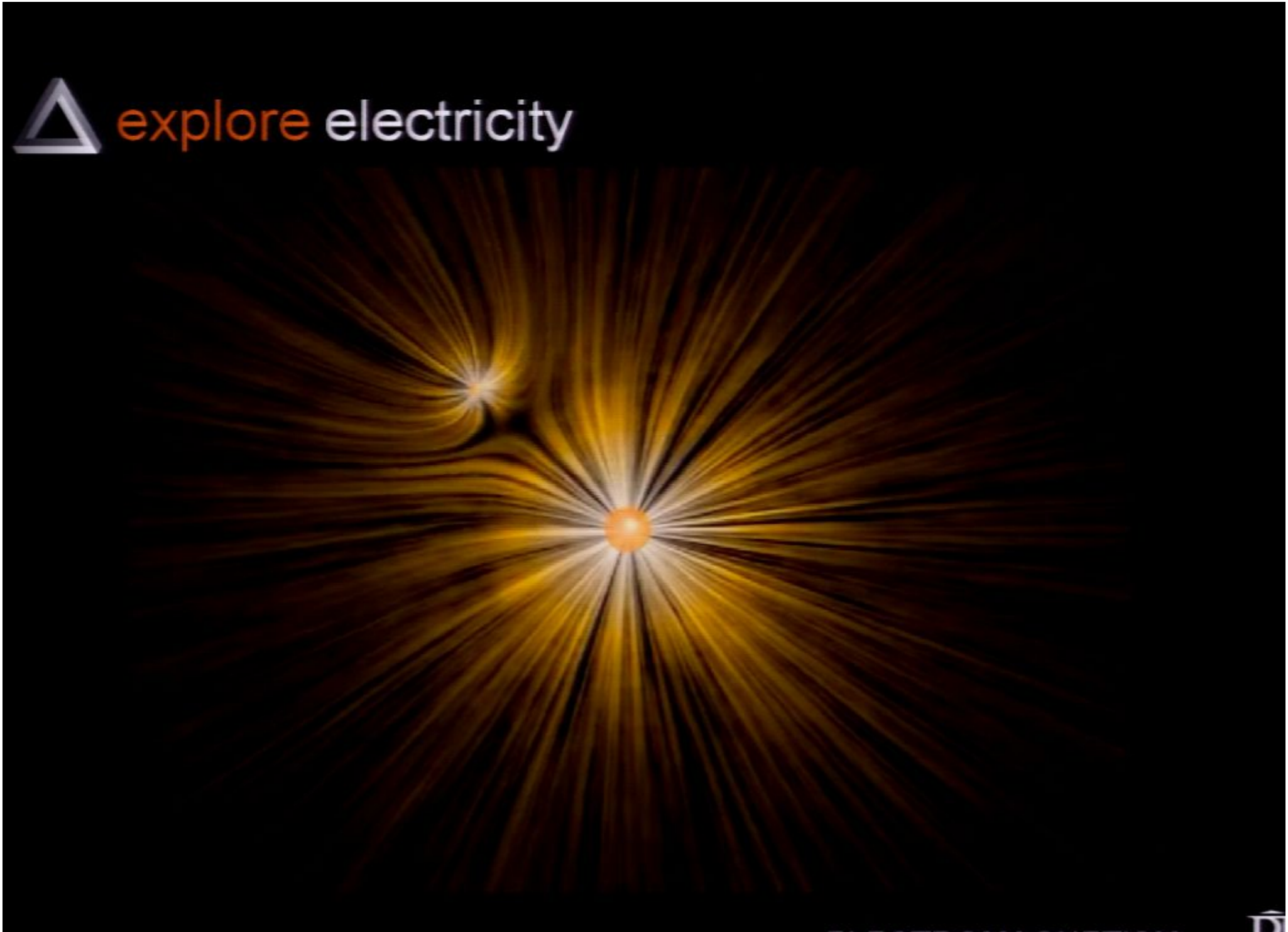
explore electricity


explore electricity

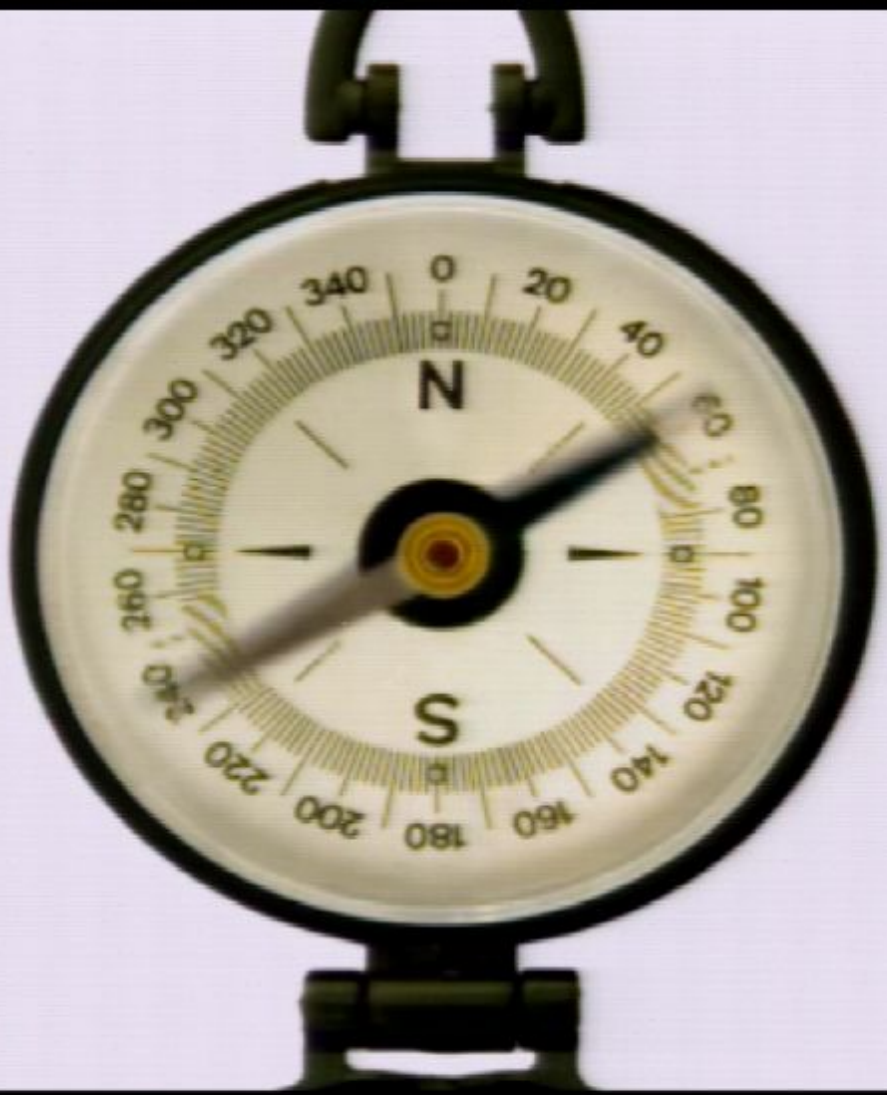

explore electricity


explore electricity

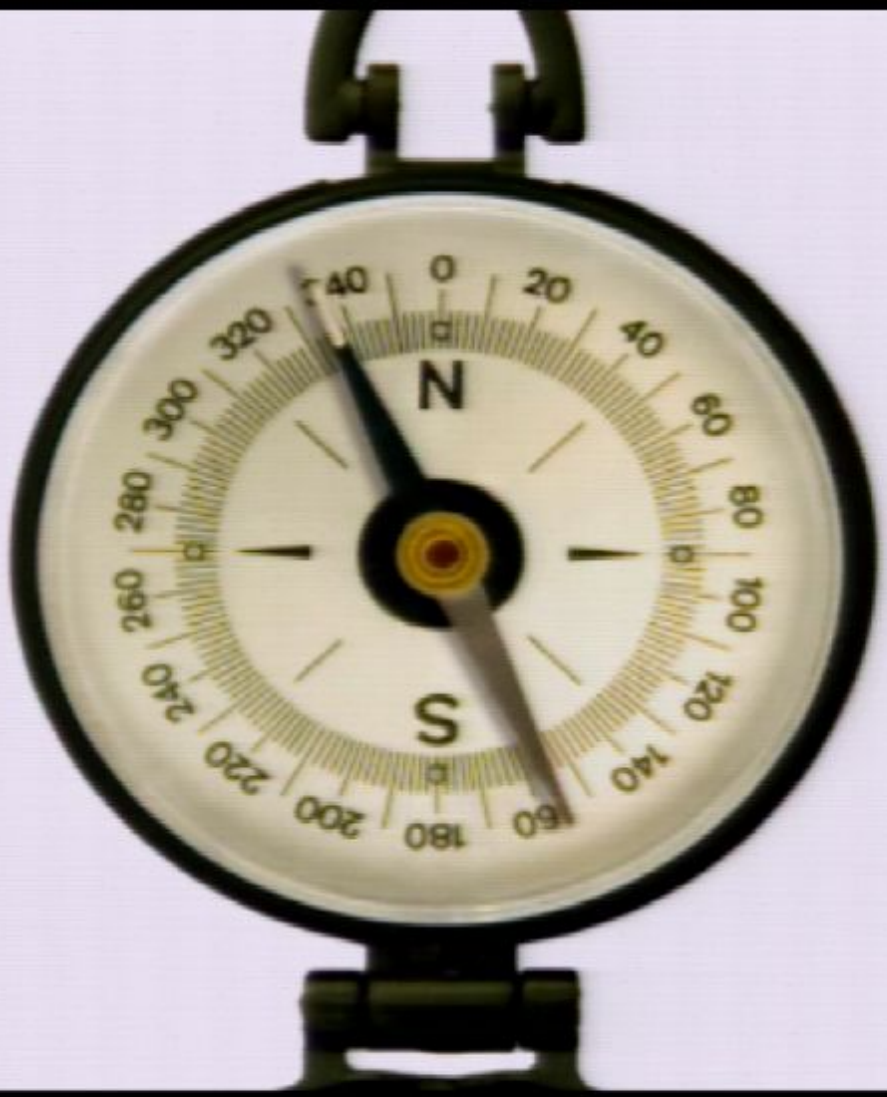
explore electricity


explore electricity

explore magnetism



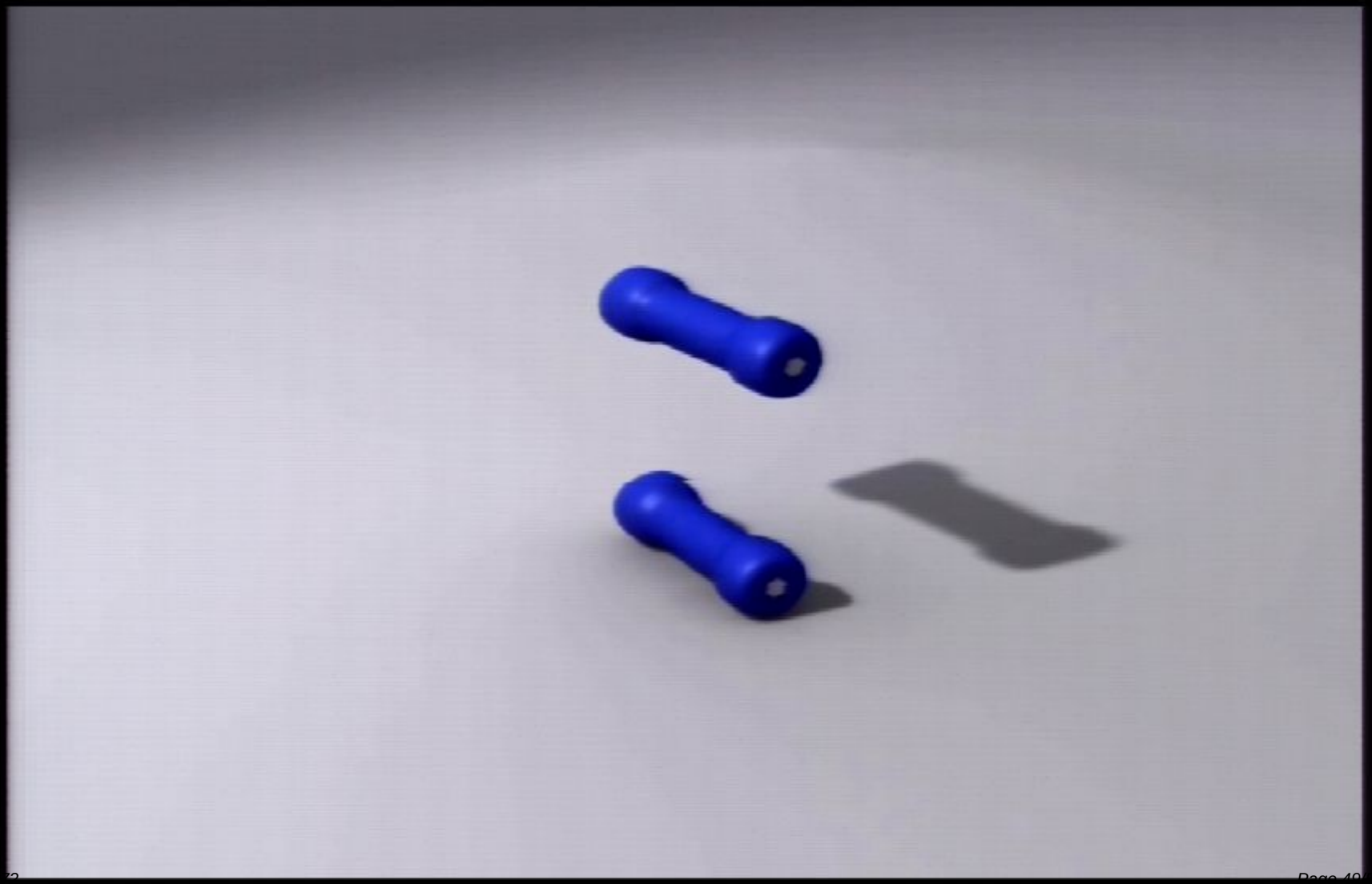
explore magnetism



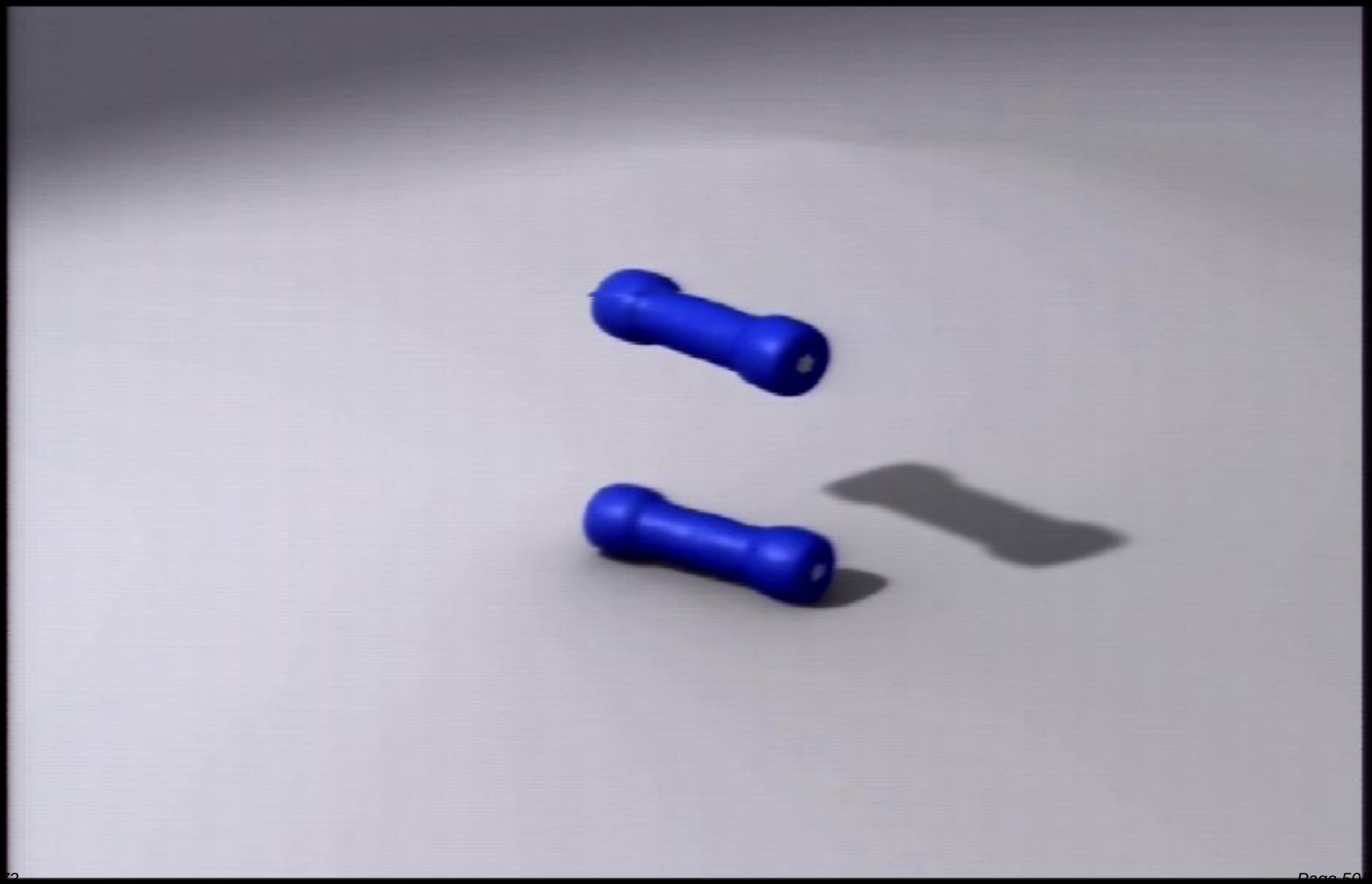
explore magnetism

Simulated Reality

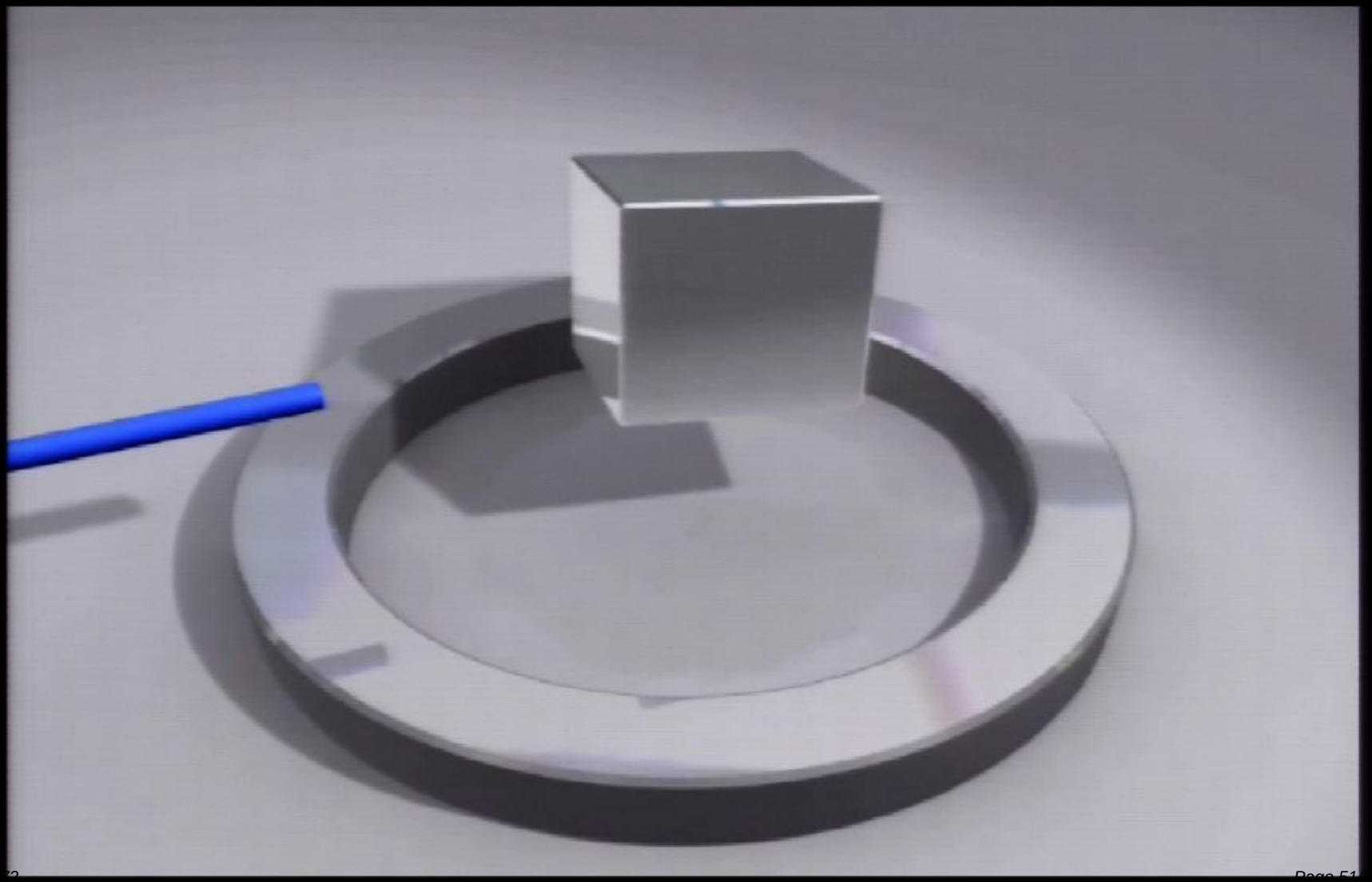
explore magnetism



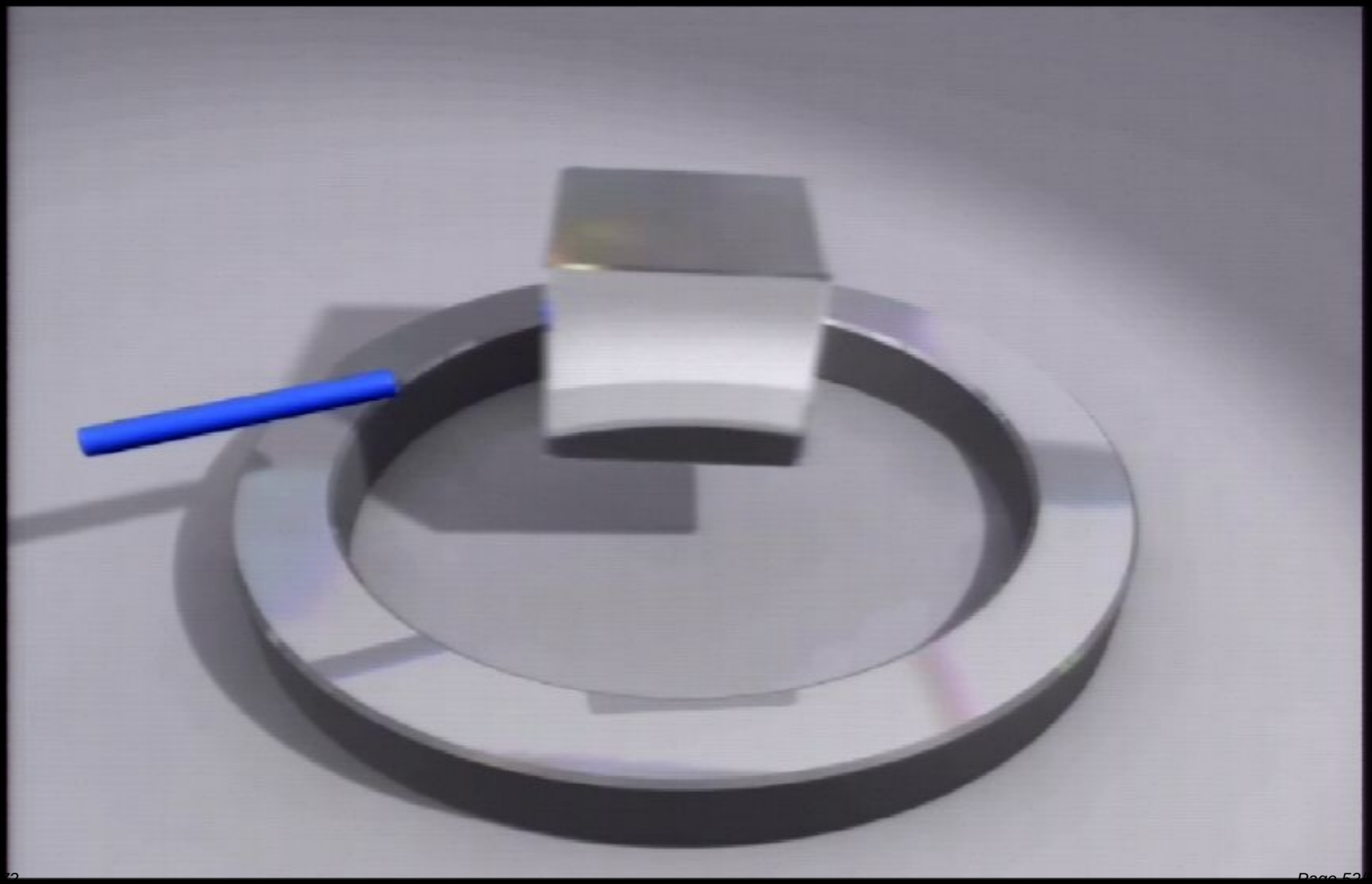
explore magnetism



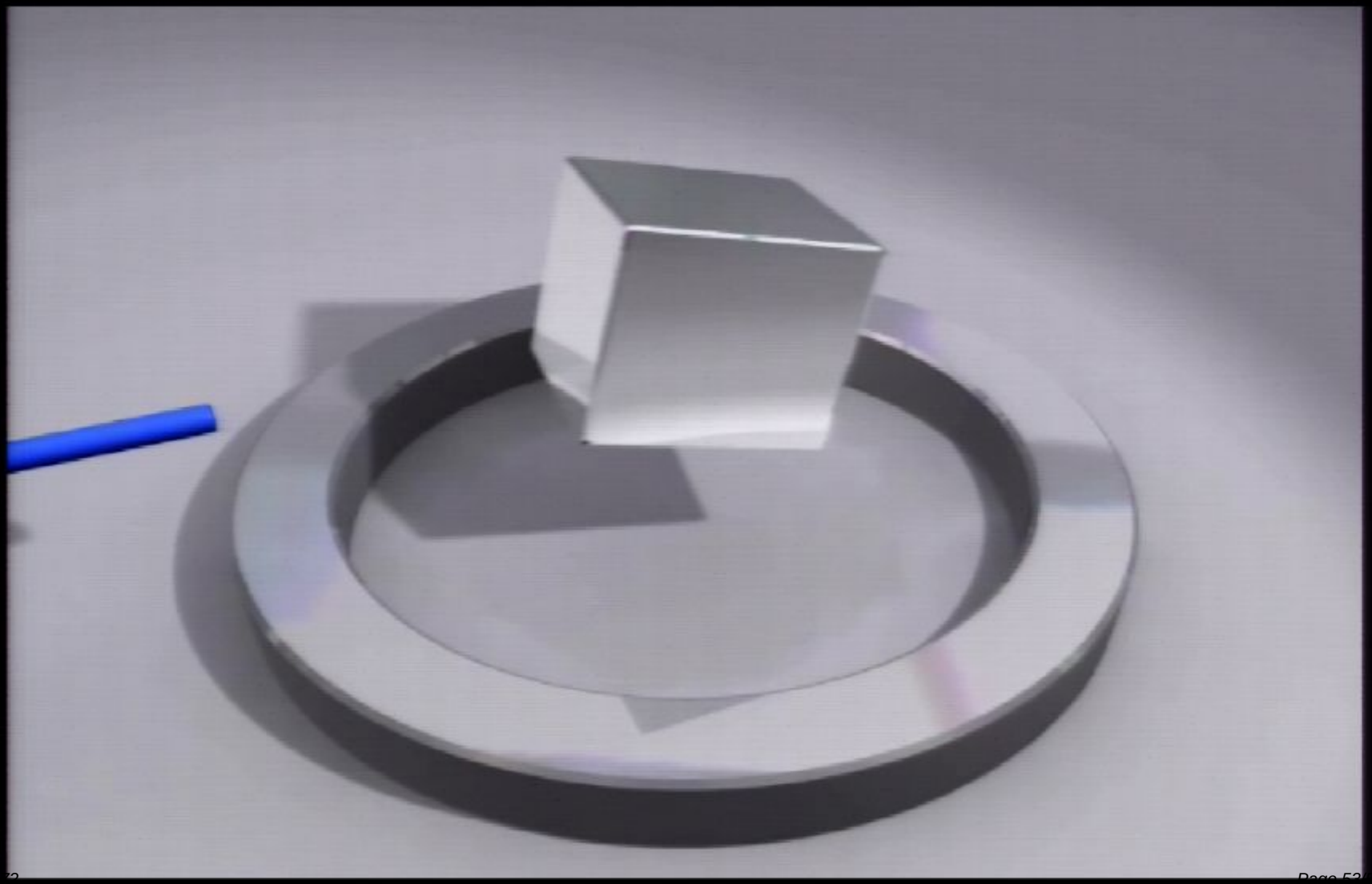
explore magnetism



explore magnetism



explore magnetism



explore magnetism

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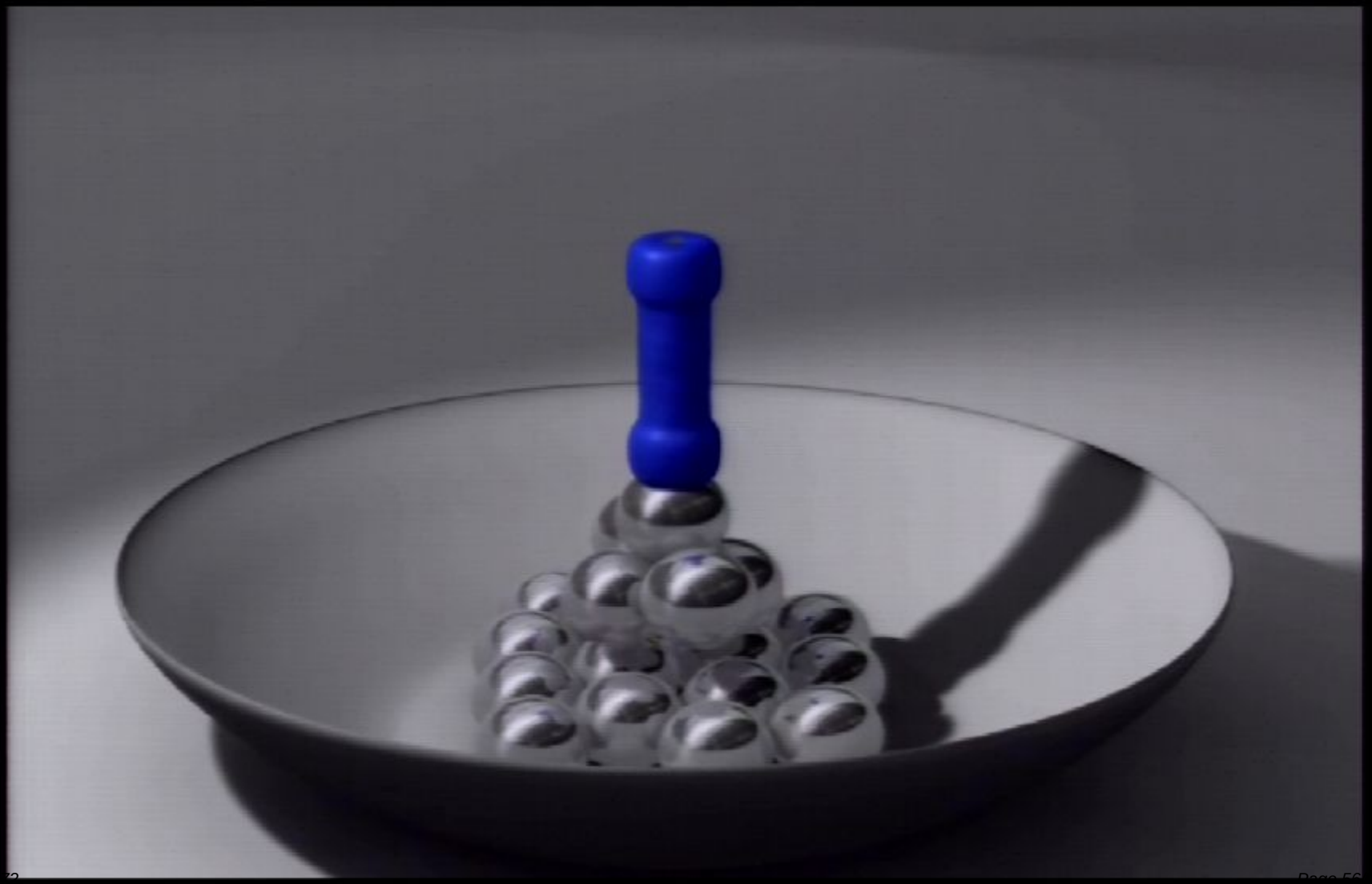

explore magnetism

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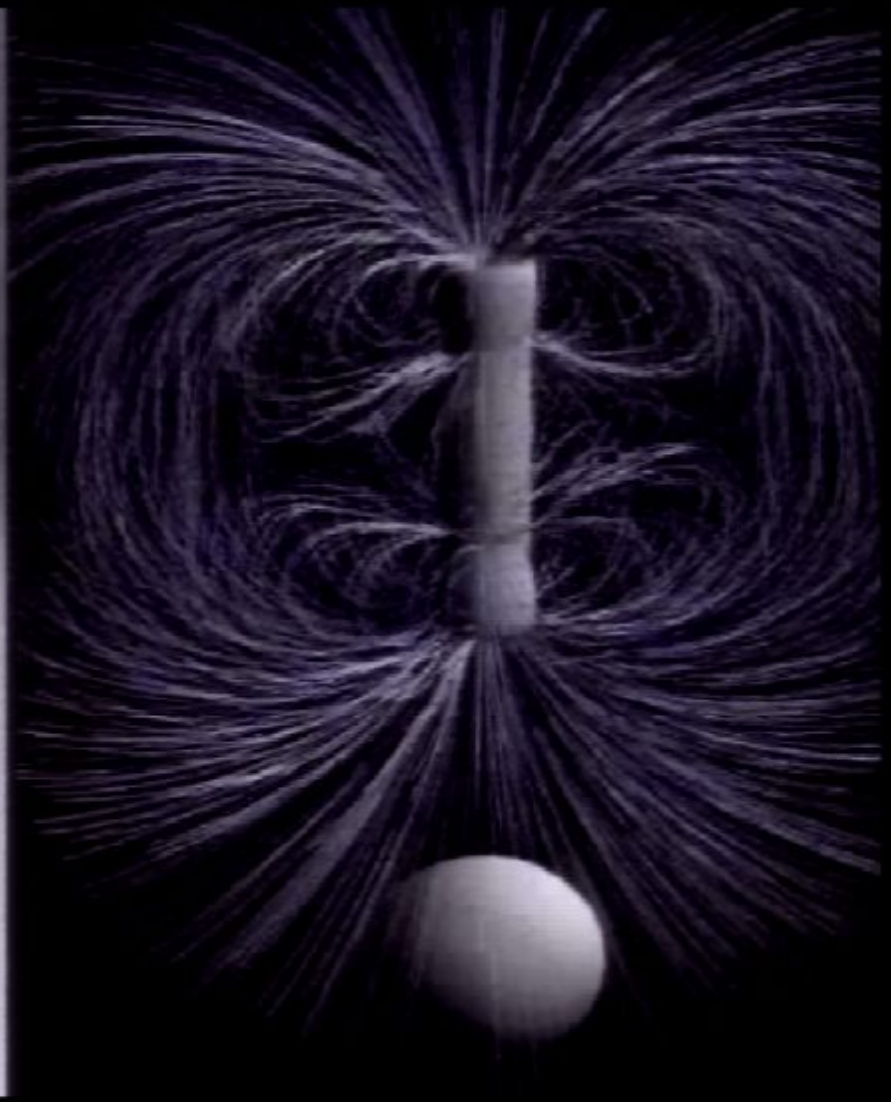
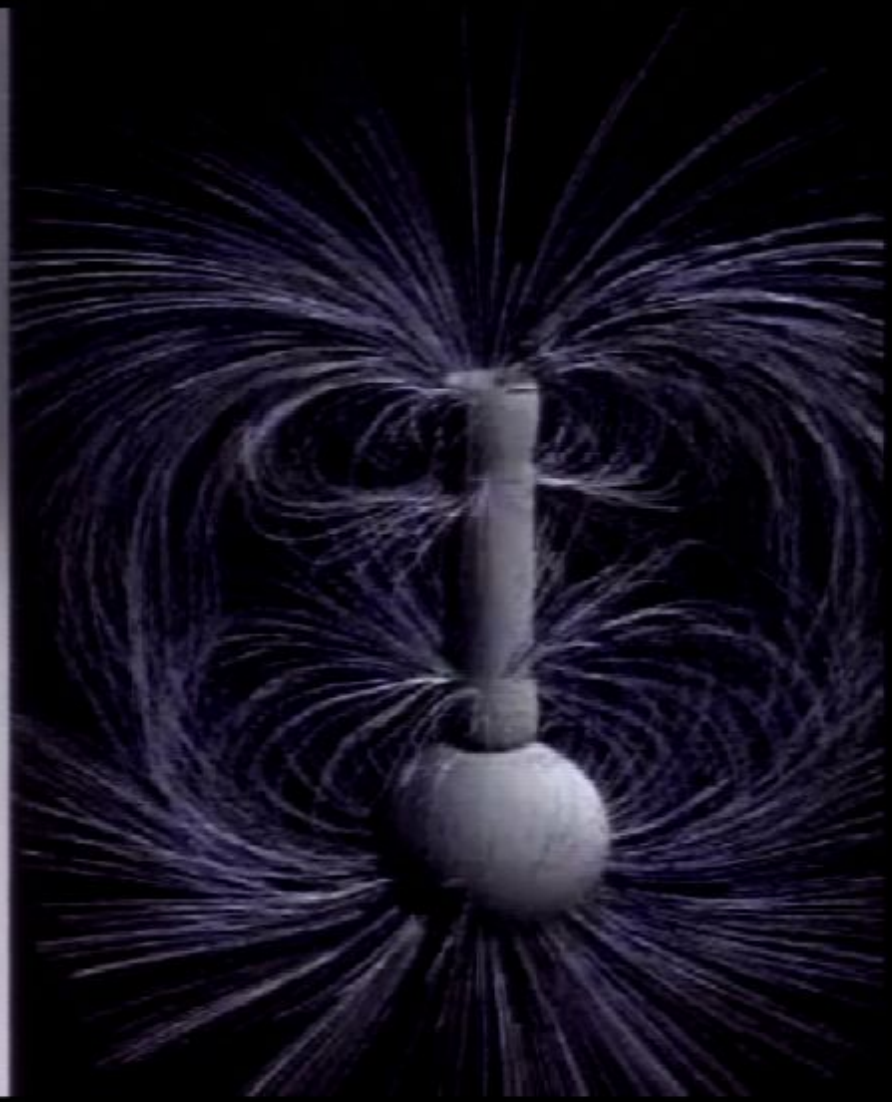


explore magnetism



understand reality
electromagnetism

understand electromagnetism

$$\nabla \cdot D = \rho$$

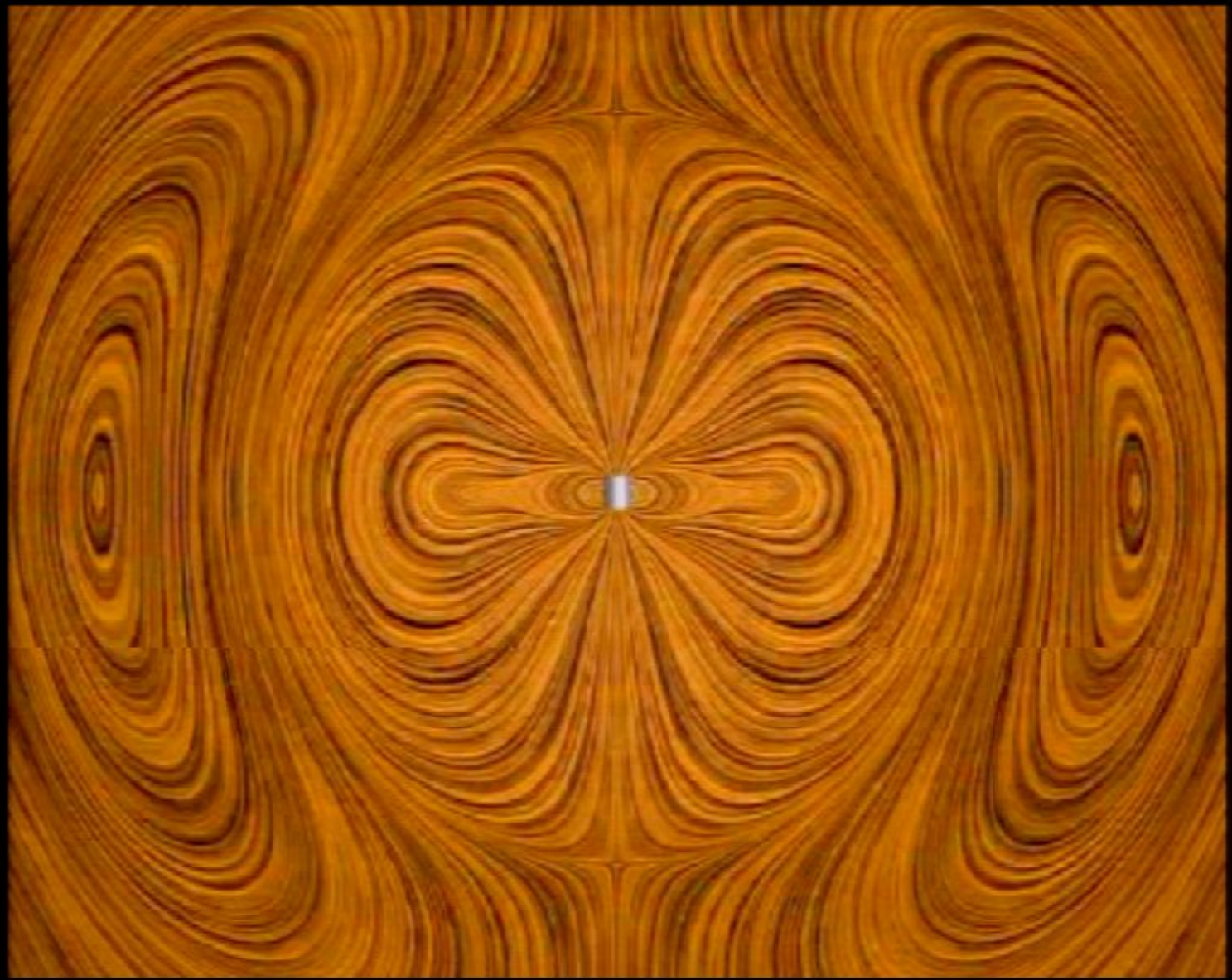
$$\nabla \cdot B = 0$$

$$\nabla \times E = -\frac{\partial B}{\partial t}$$

$$\nabla \times H = i + \frac{\partial D}{\partial t}$$

understand electromagnetism

understand electromagnetism



understand electromagnetism

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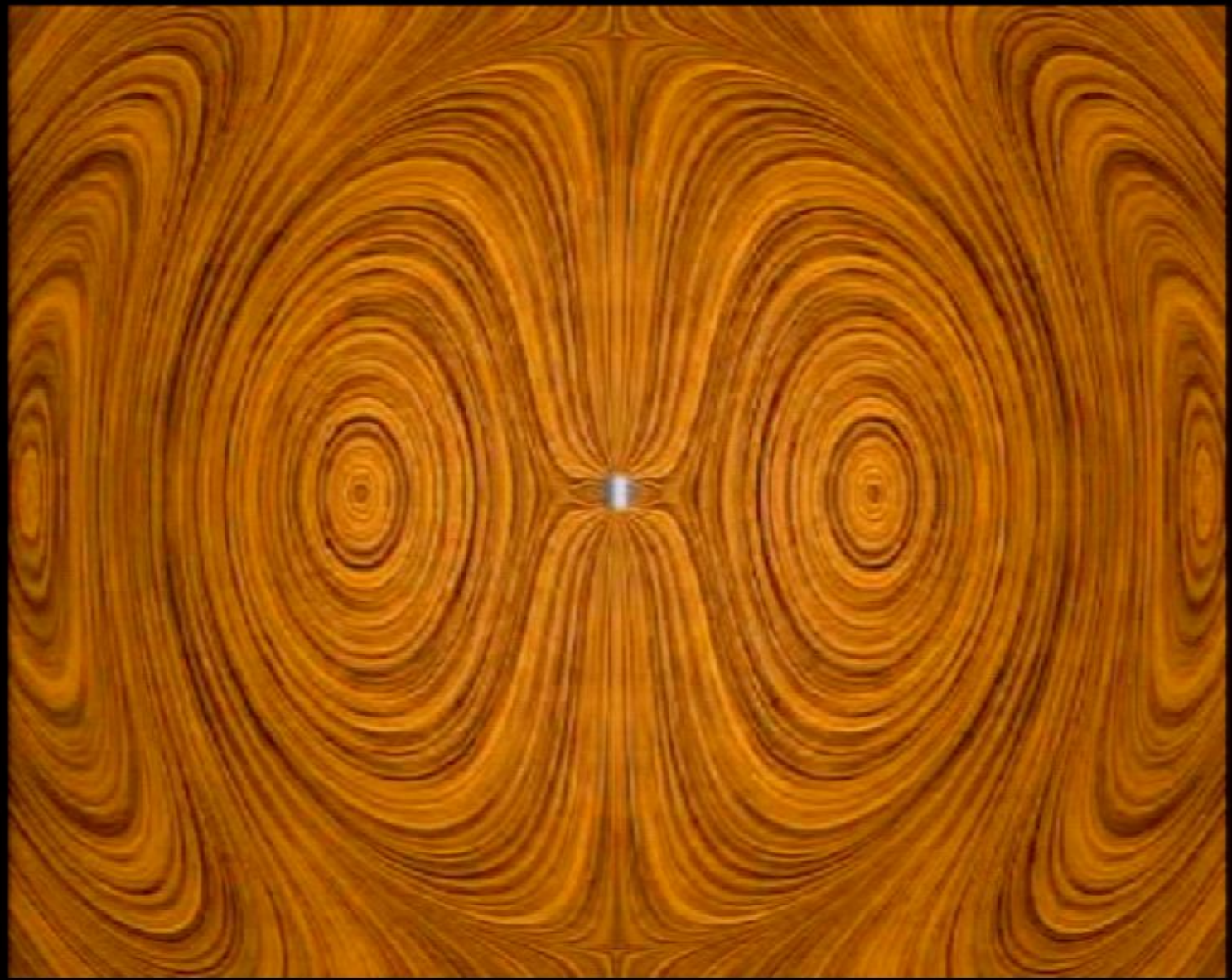
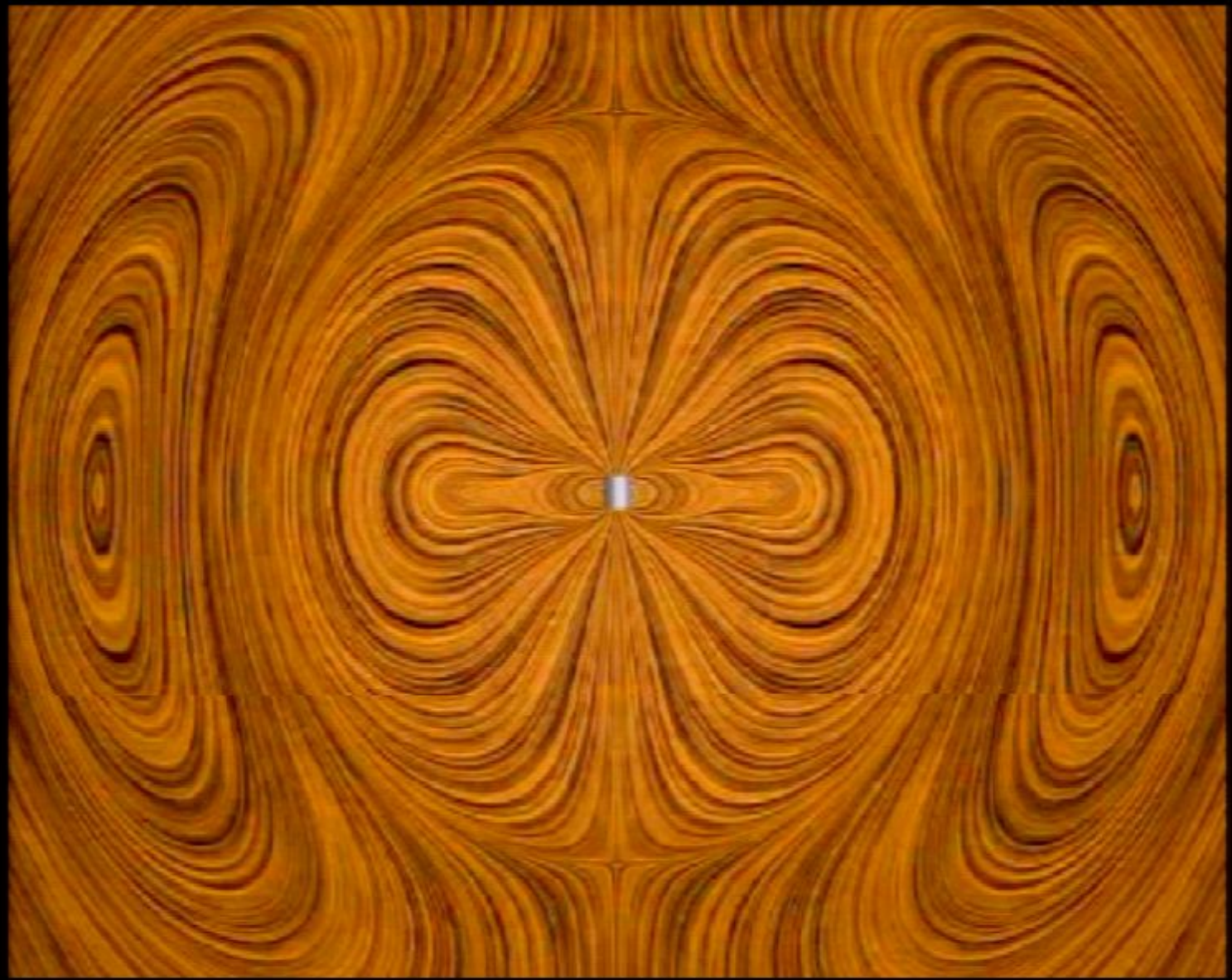


understand electromagnetism



understand electromagnetism

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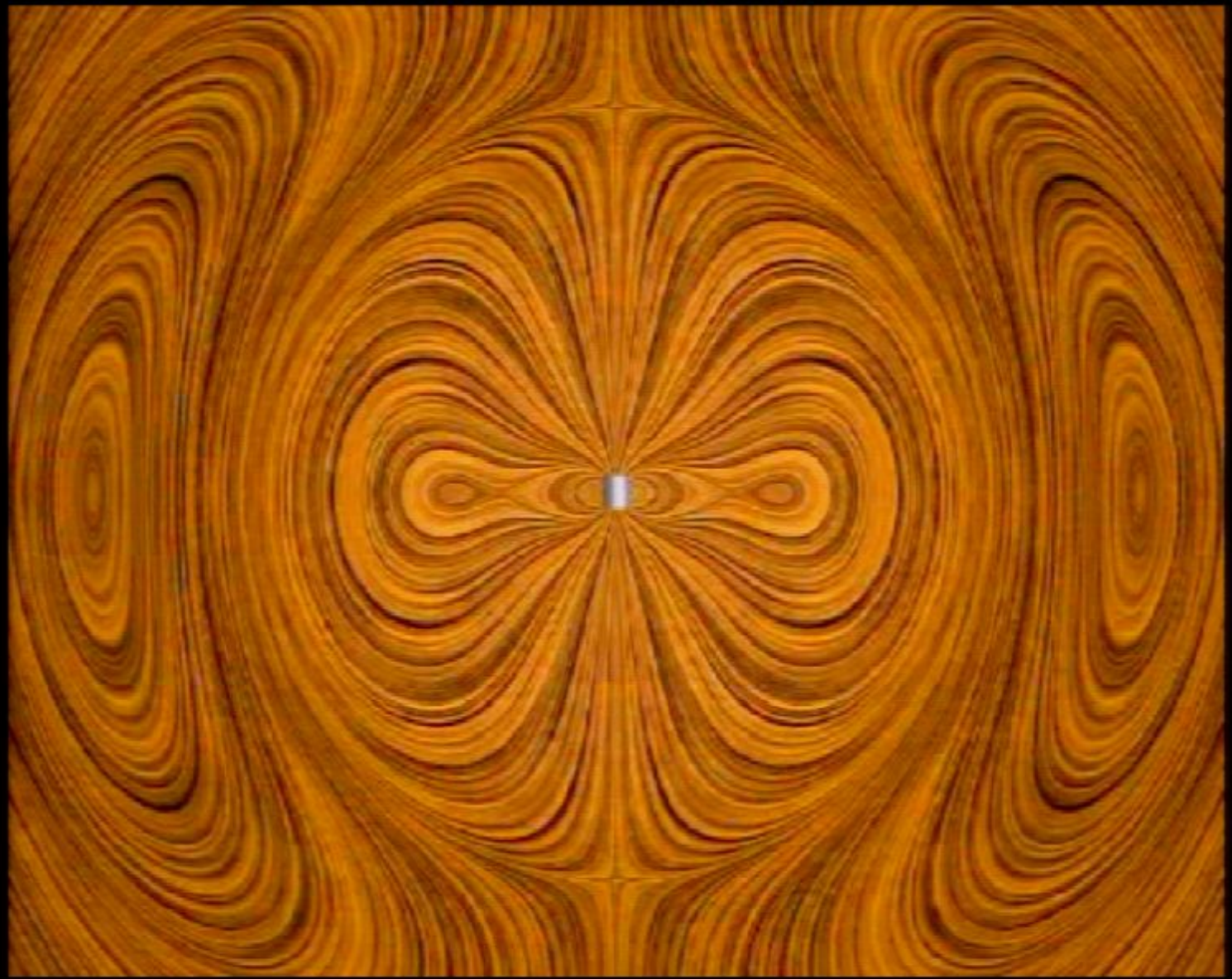
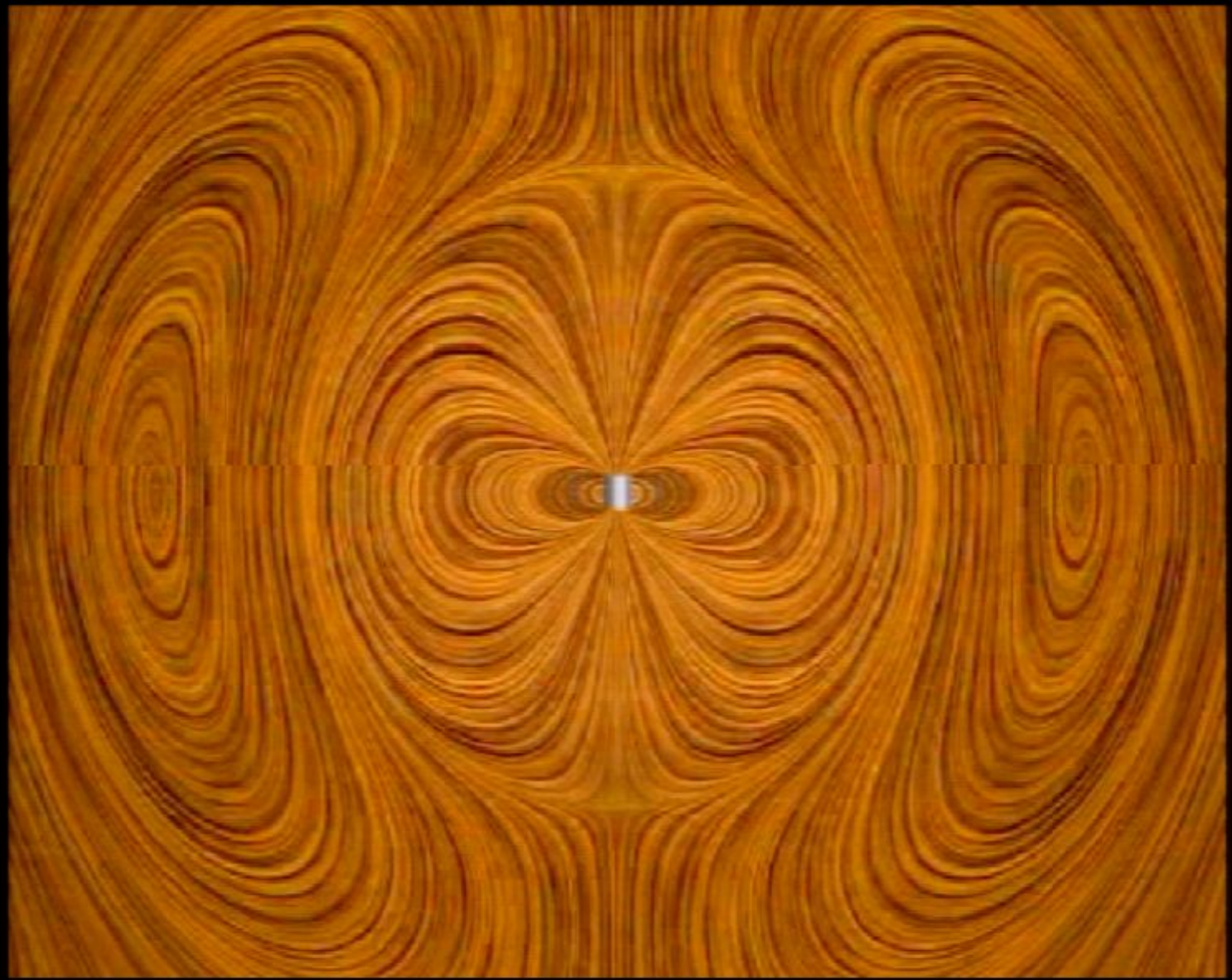


understand electromagnetism



understand electromagnetism

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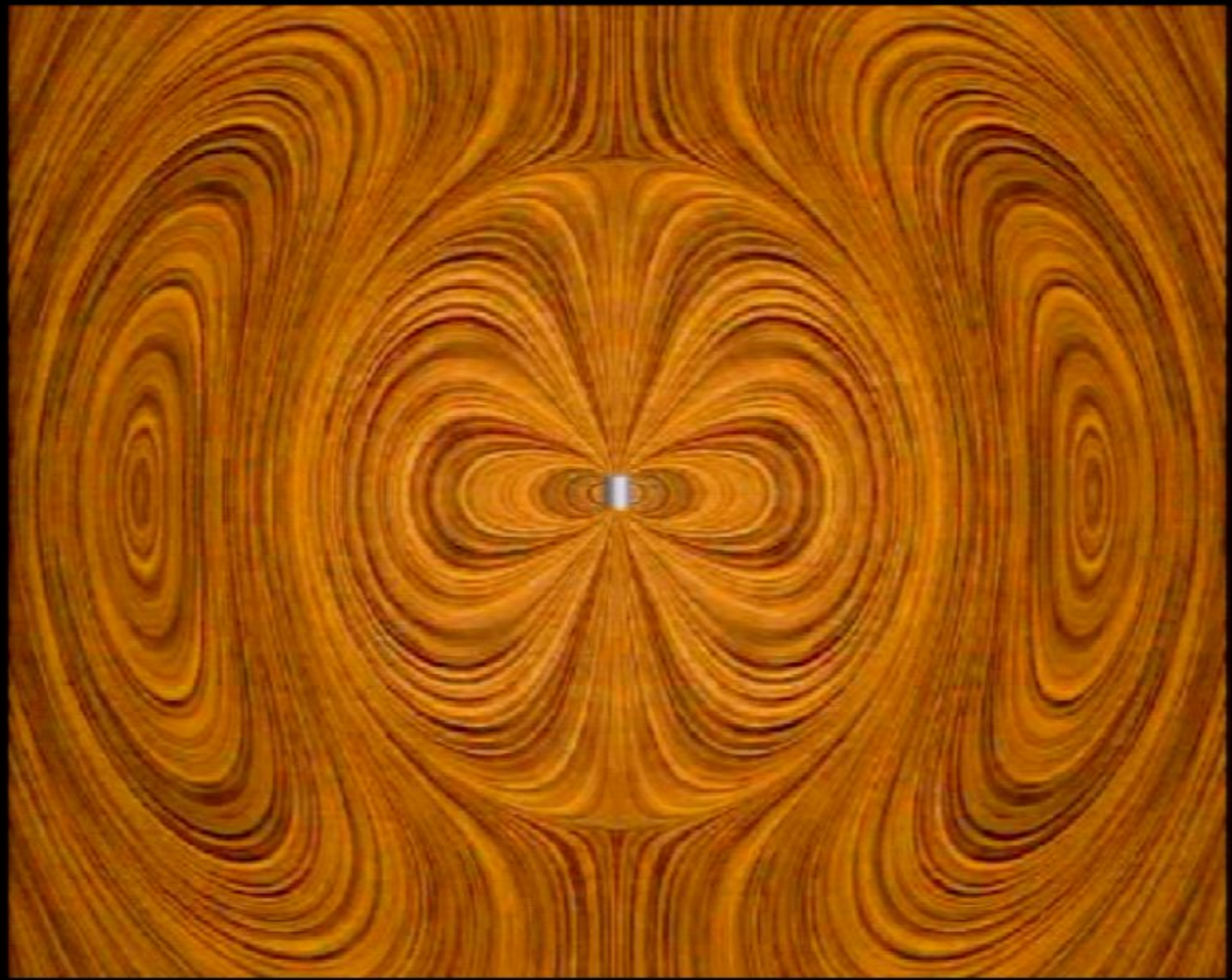
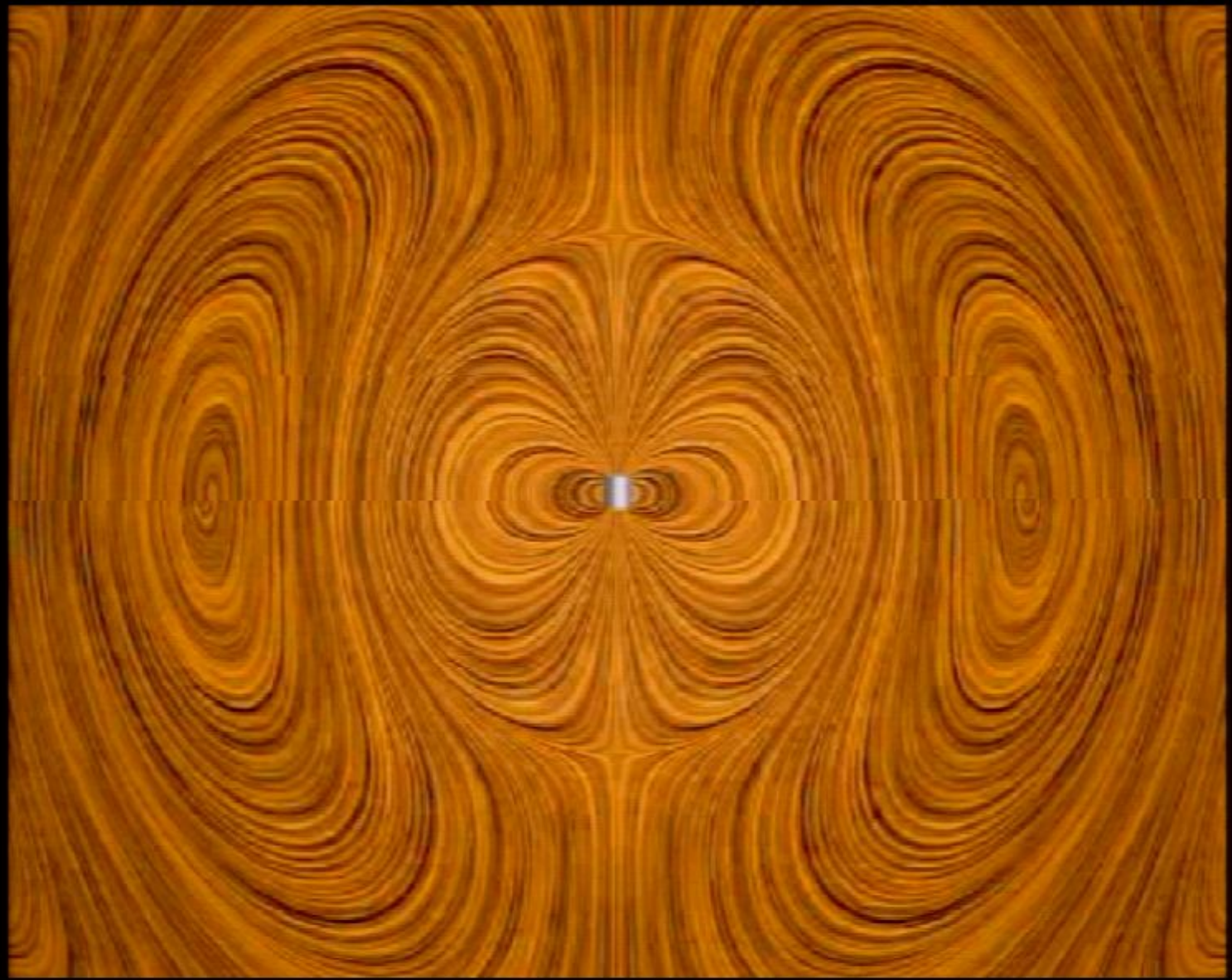
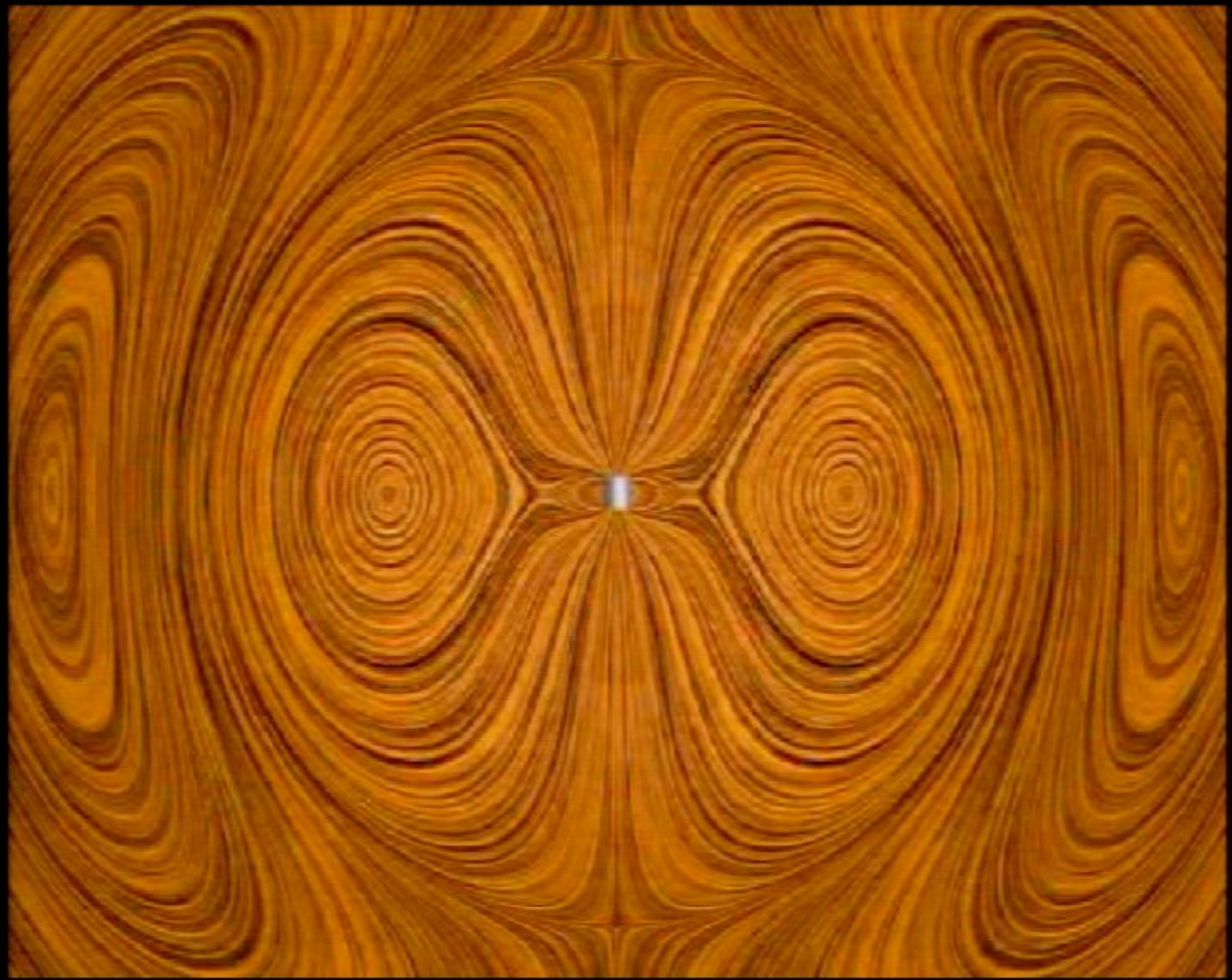


understand electromagnetism

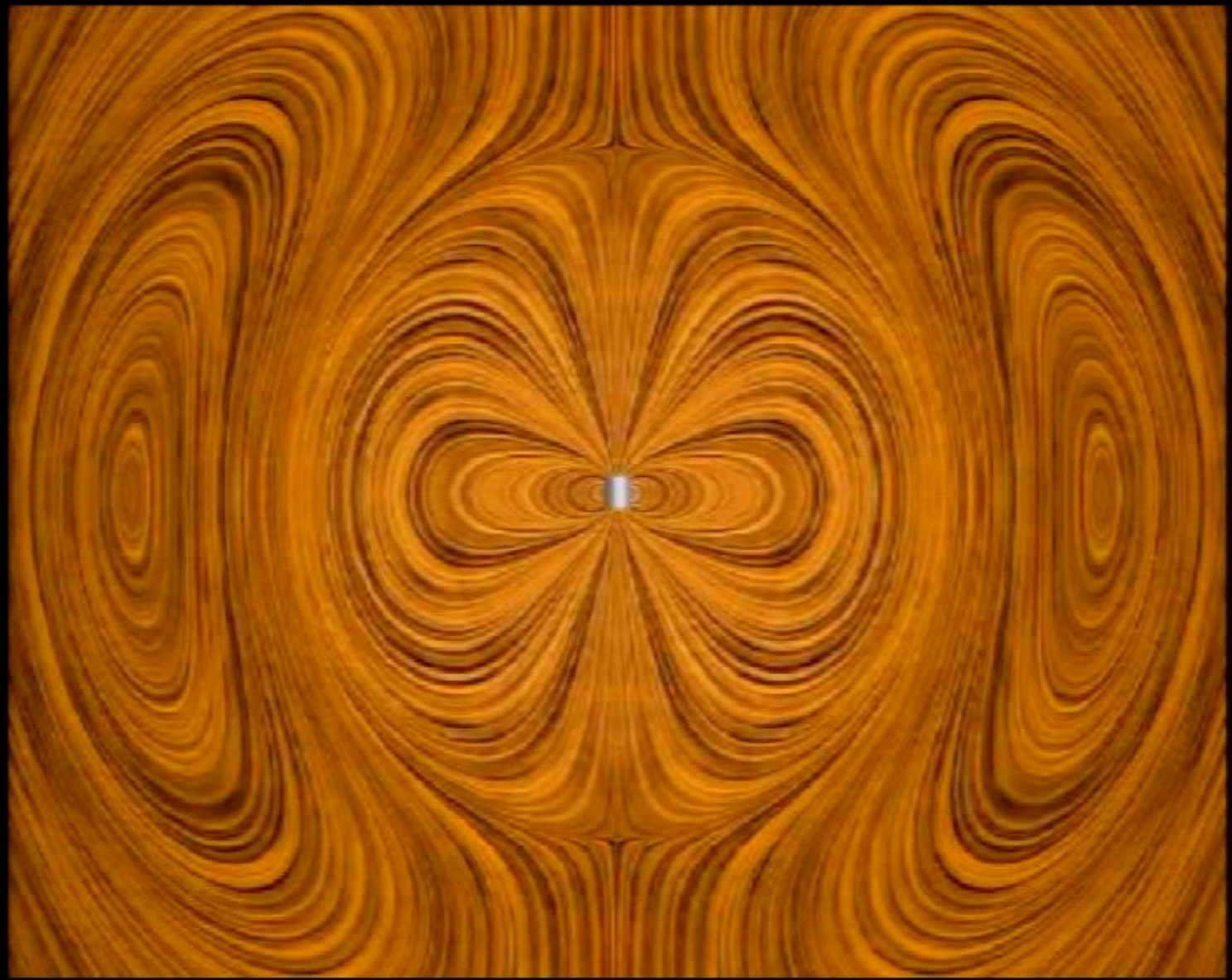


understand electromagnetism

understand electromagnetism



understand electromagnetism



understand electromagnetism

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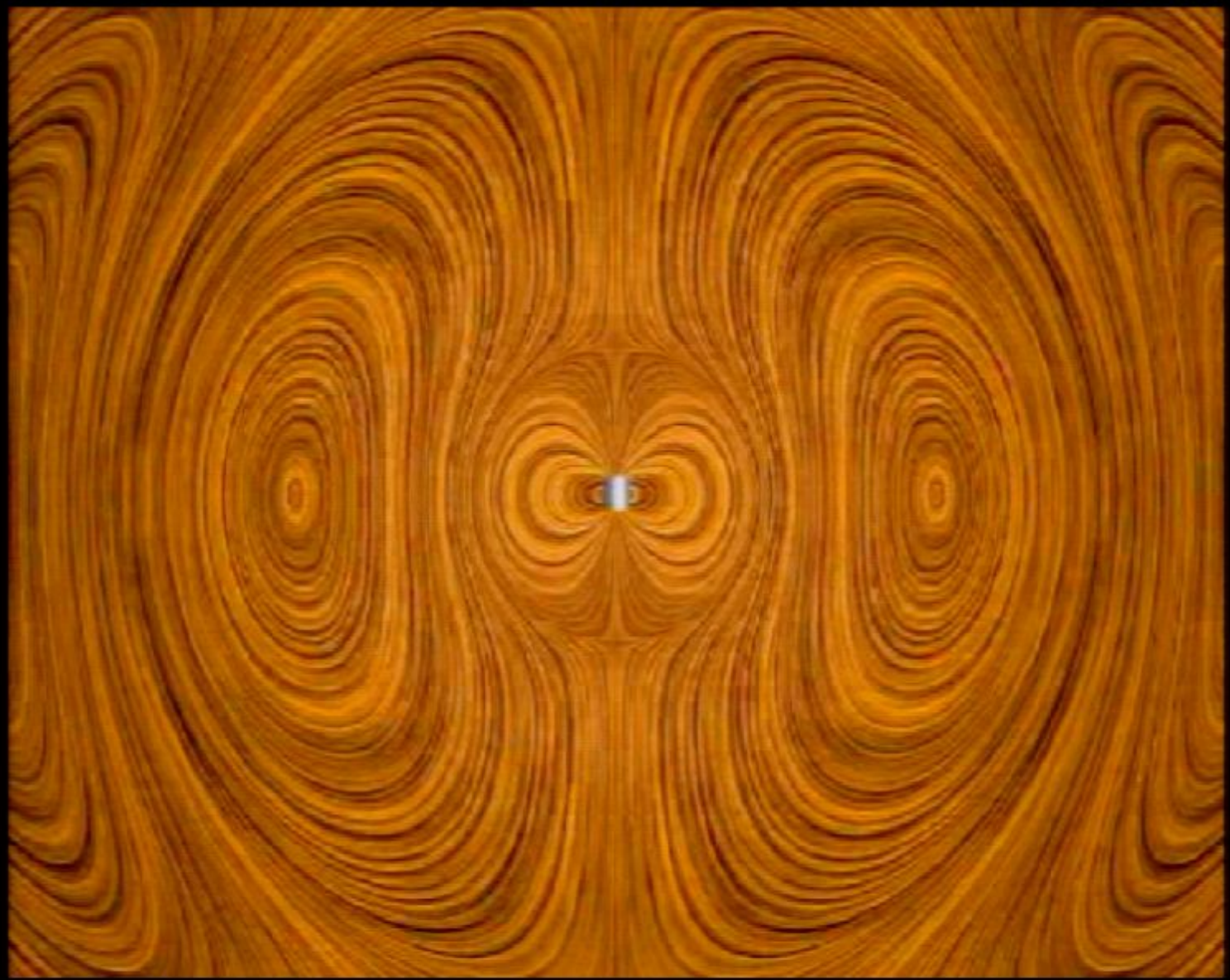
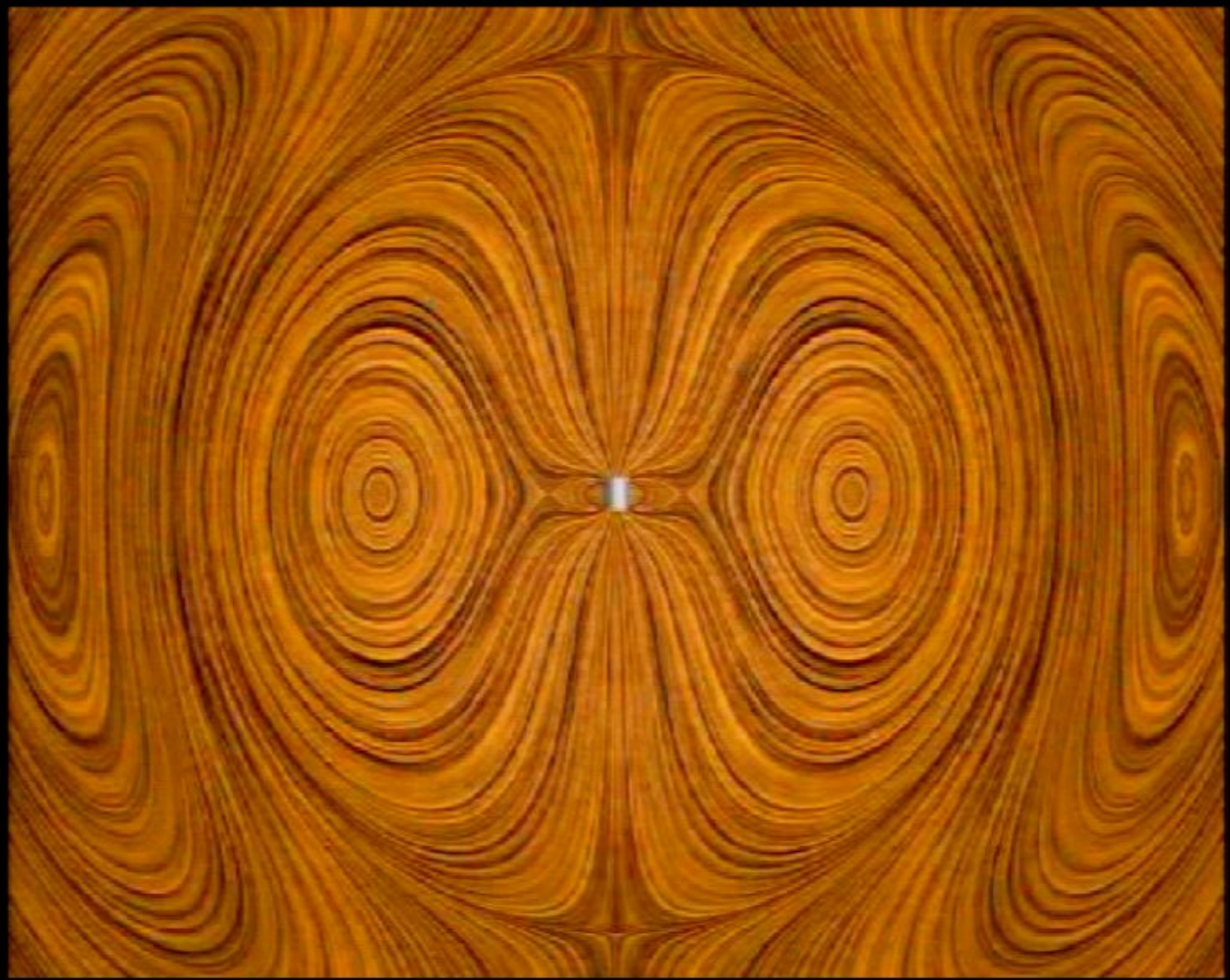
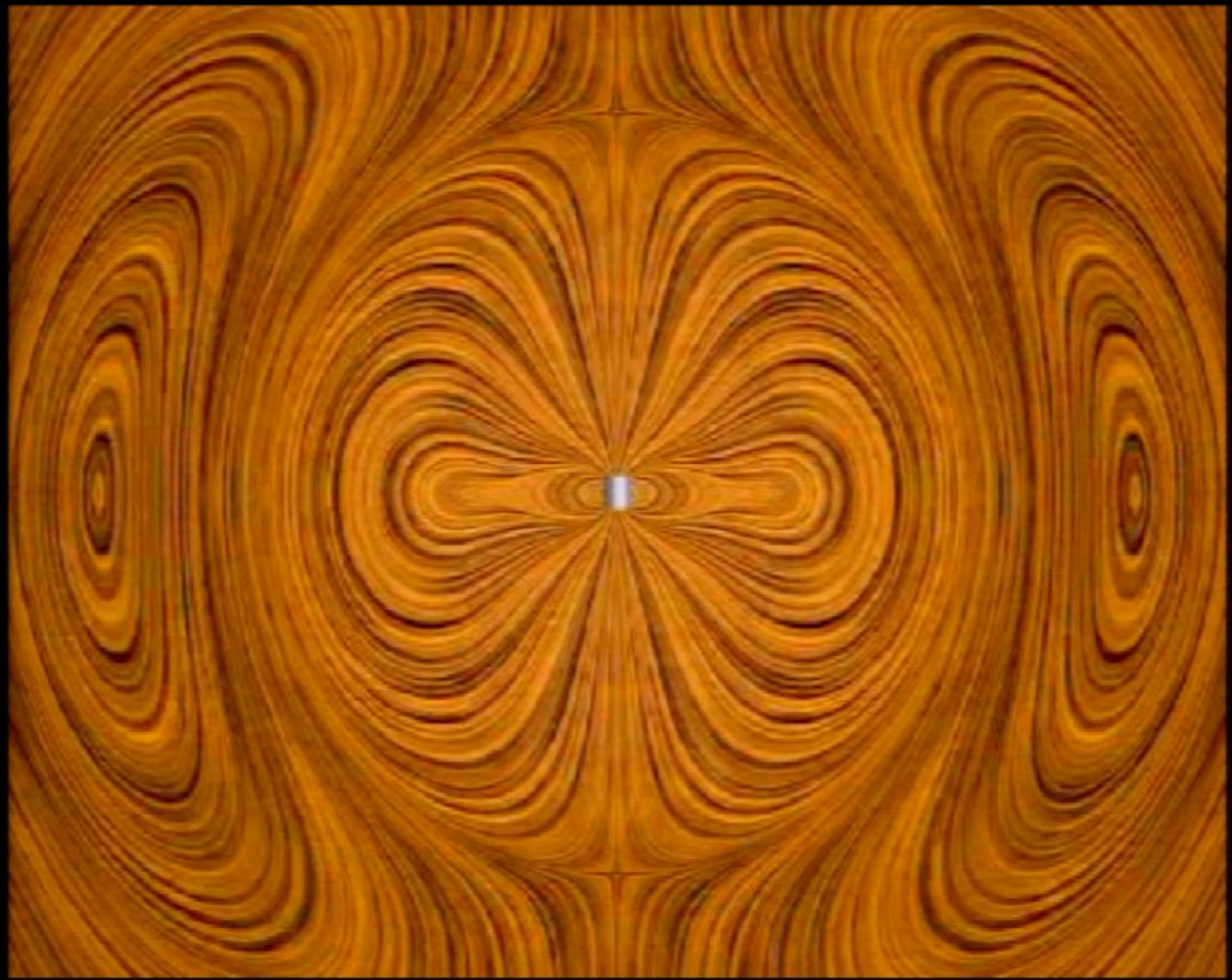


understand electromagnetism



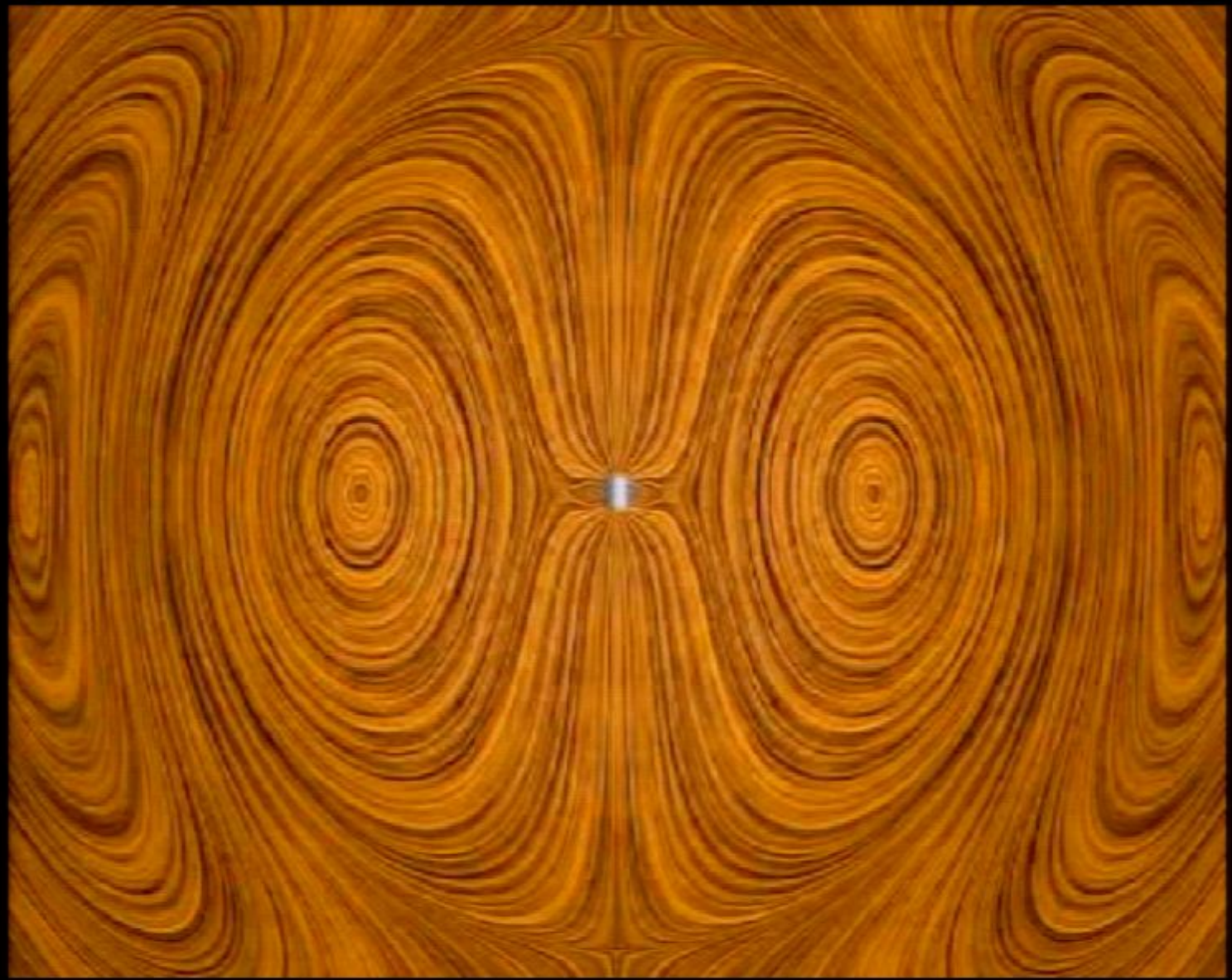
understand electromagnetism



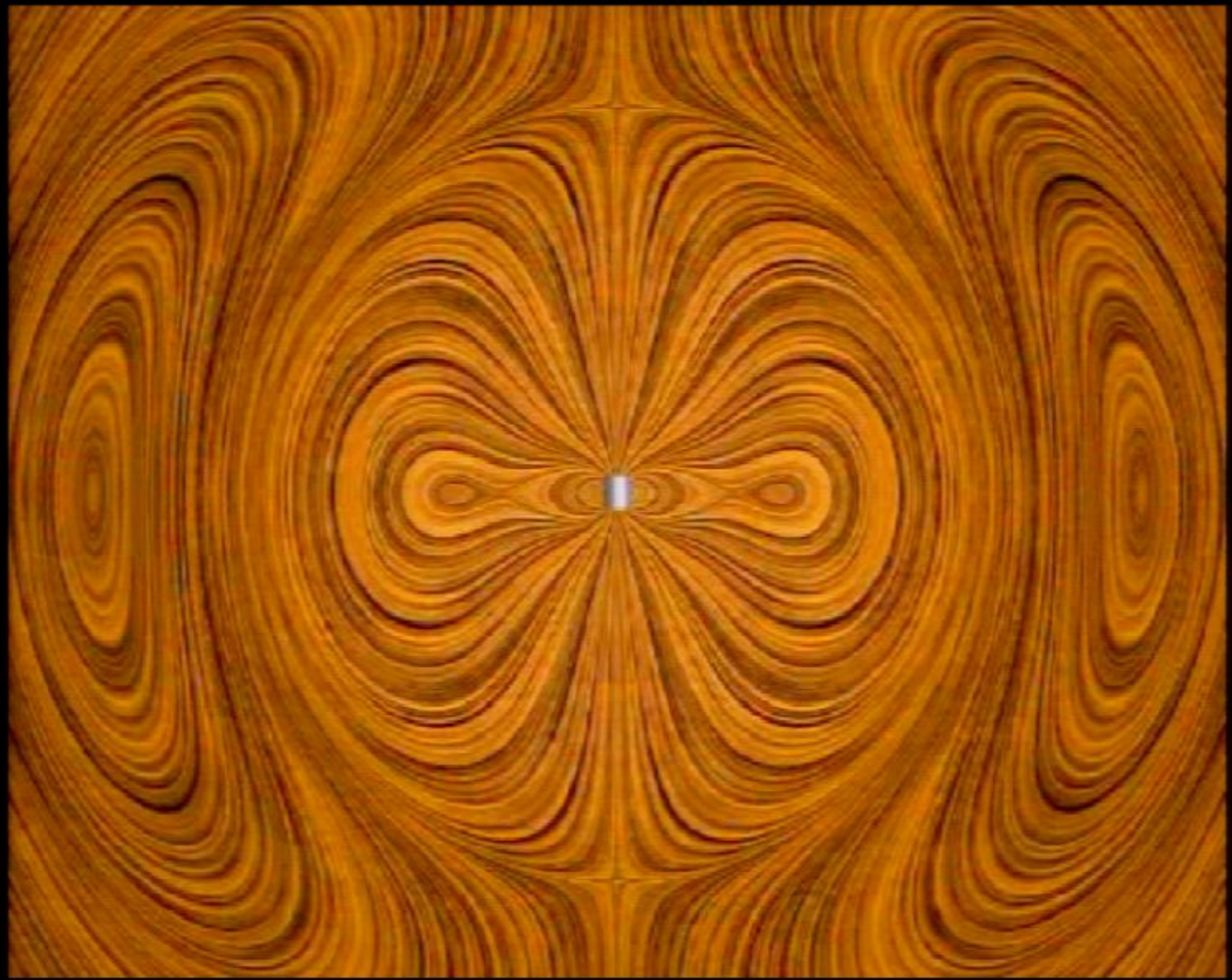
understand electromagnetism

understand electromagnetism

understand electromagnetism



understand electromagnetism



understand electromagnetism

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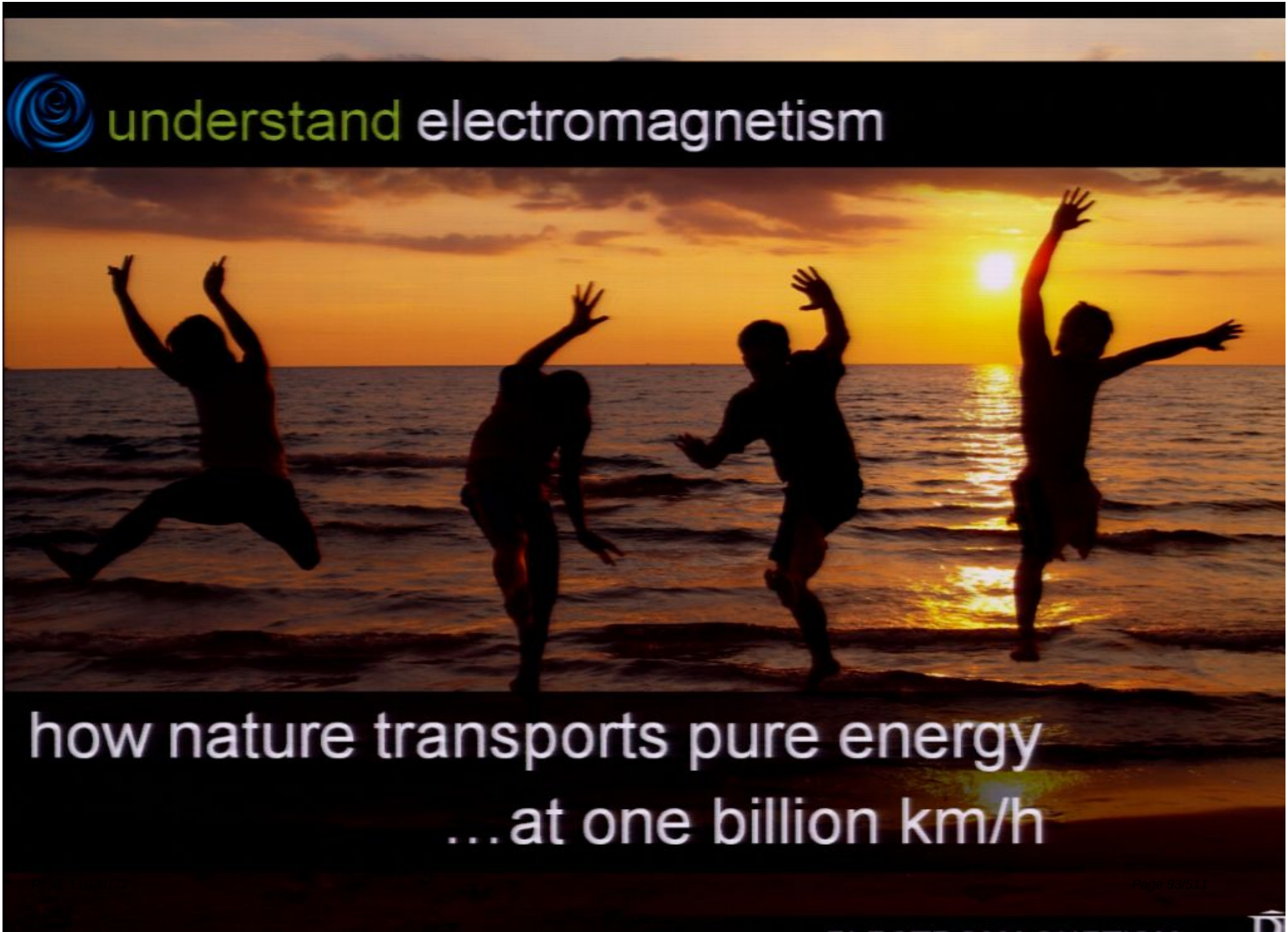

understand electromagnetism
how nature transports pure energy
…at one billion km/h

build cool stuff

telecommunication devices

build cool stuff

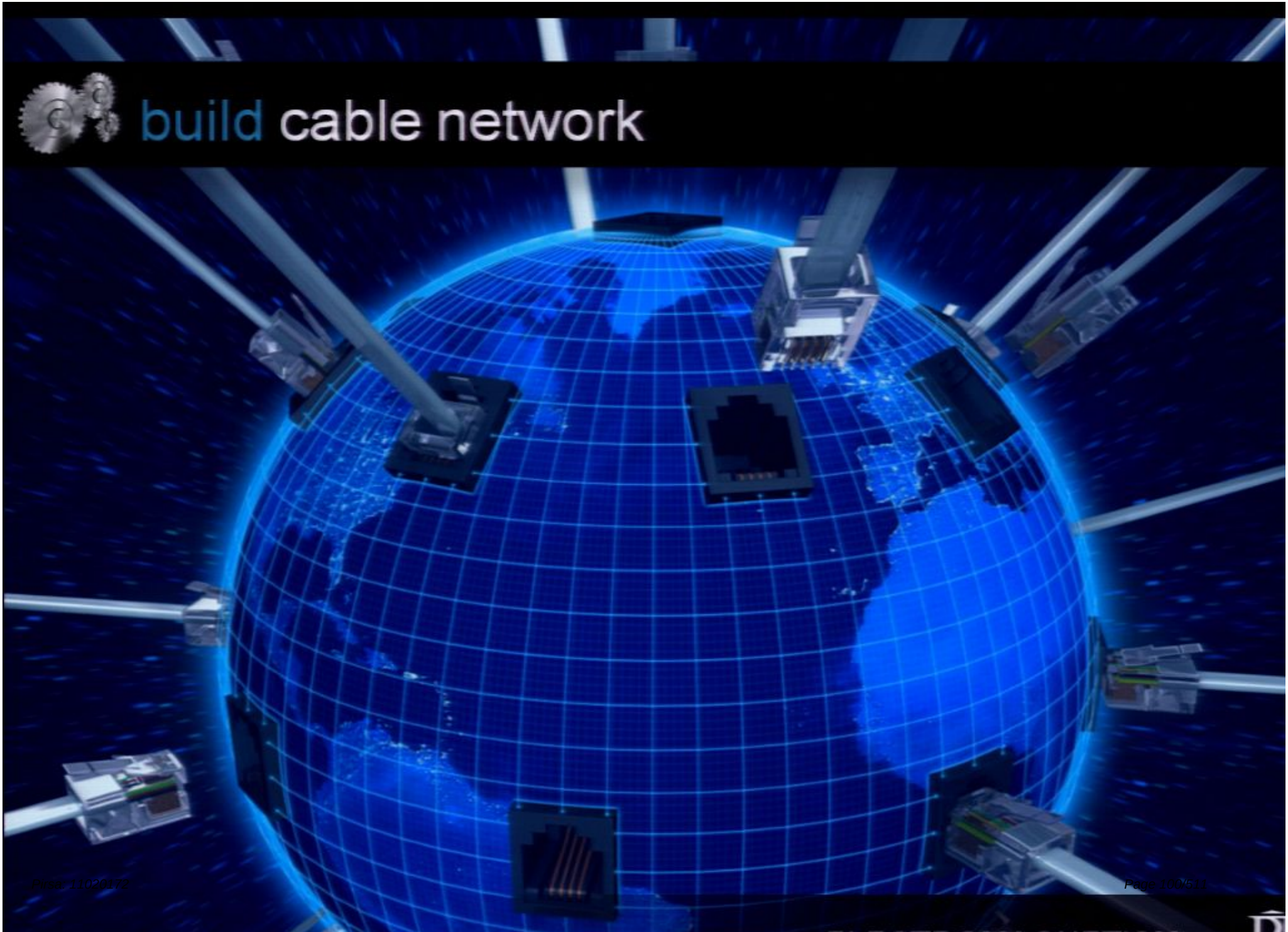
telecommunication devices

build radio

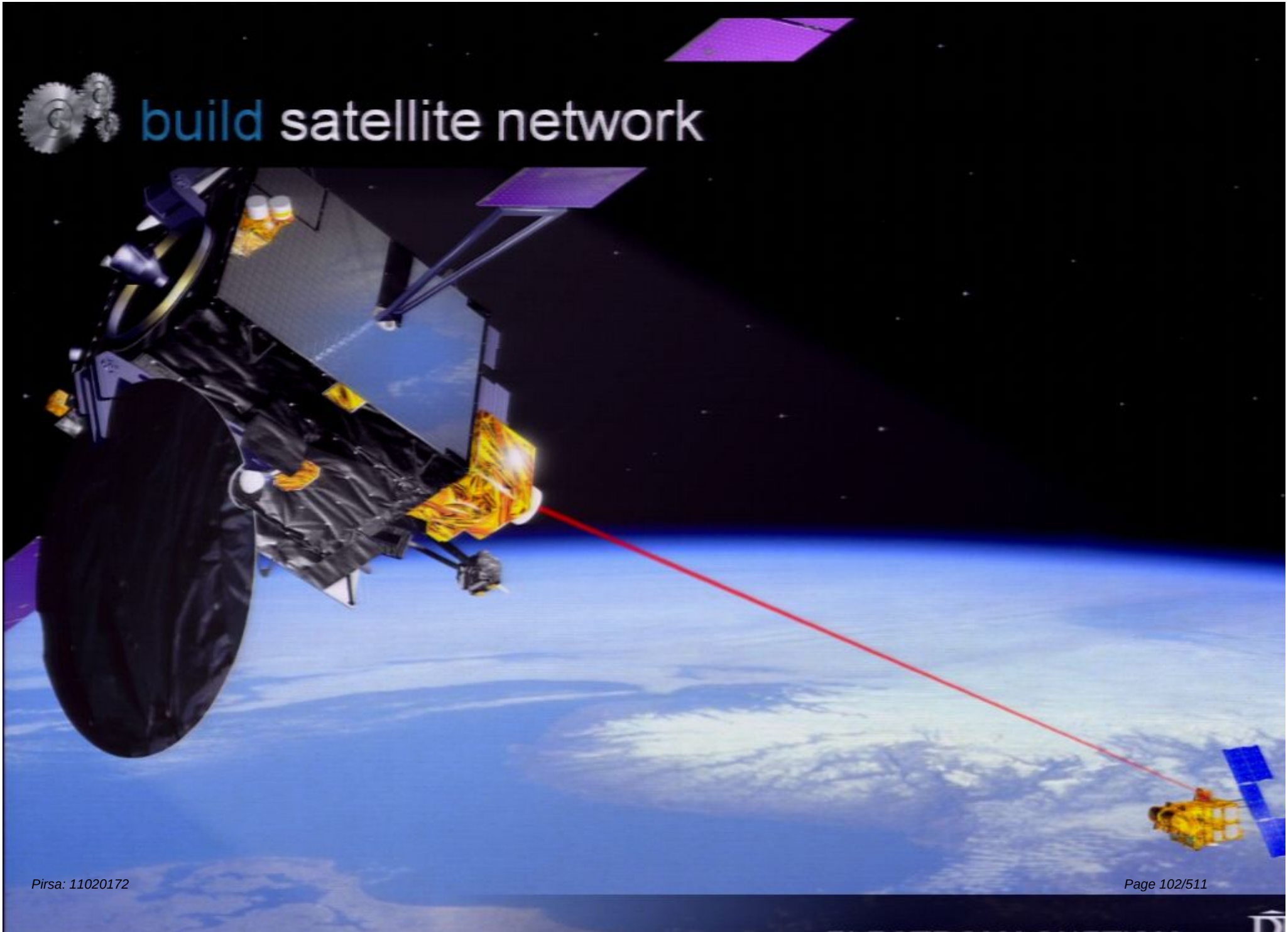
build radio

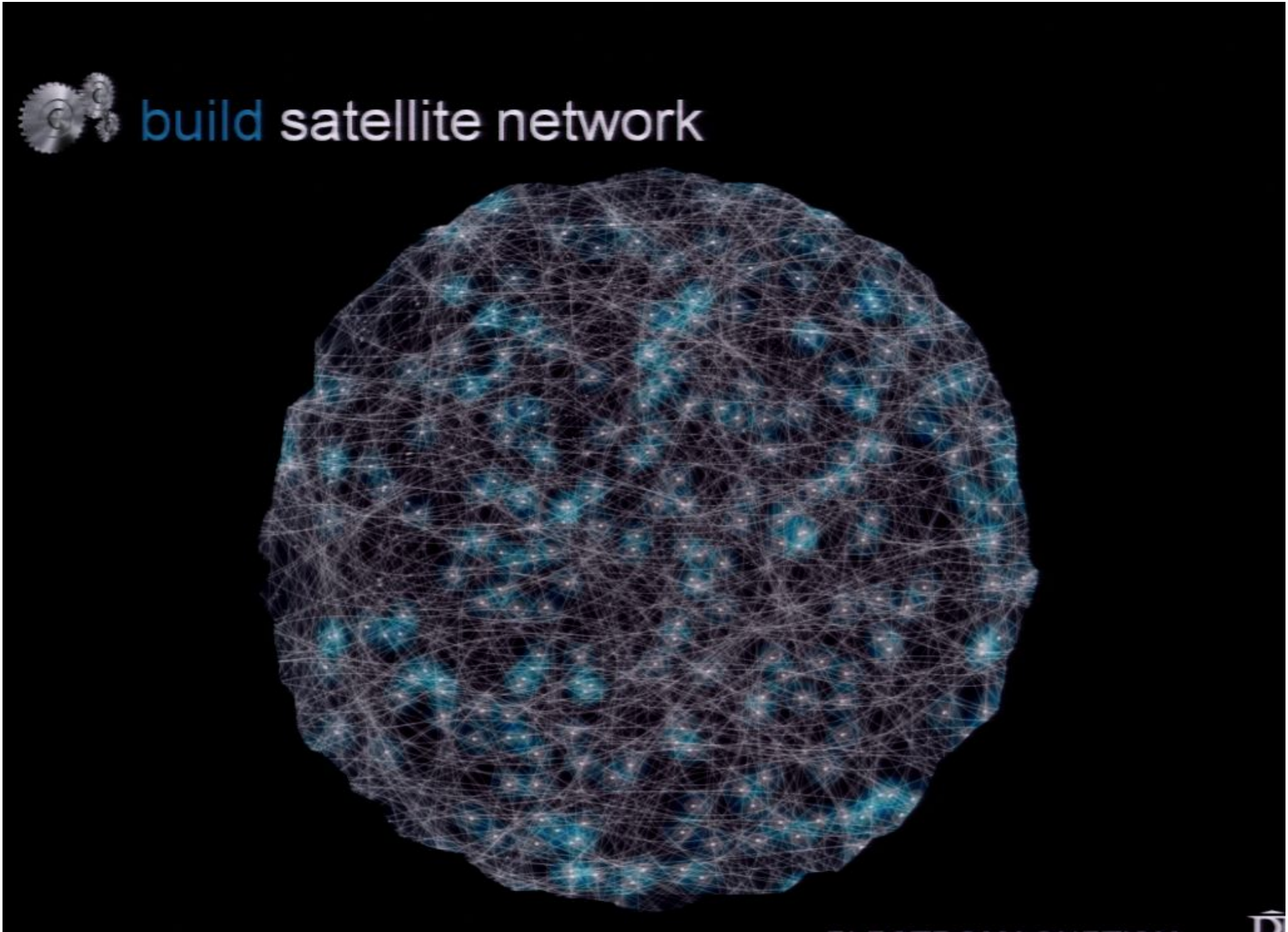
build television

build television

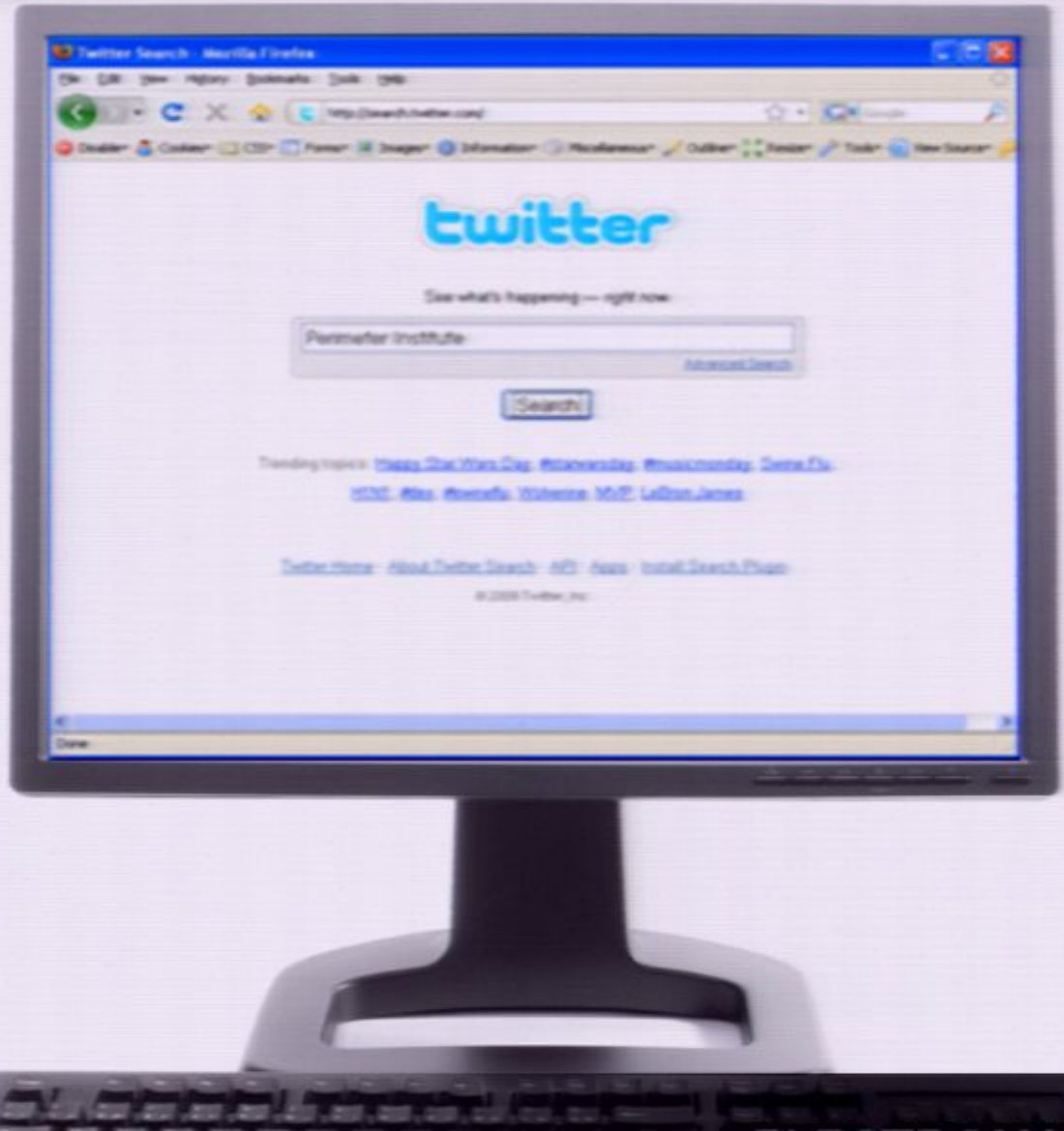

build cable network

build microwave network

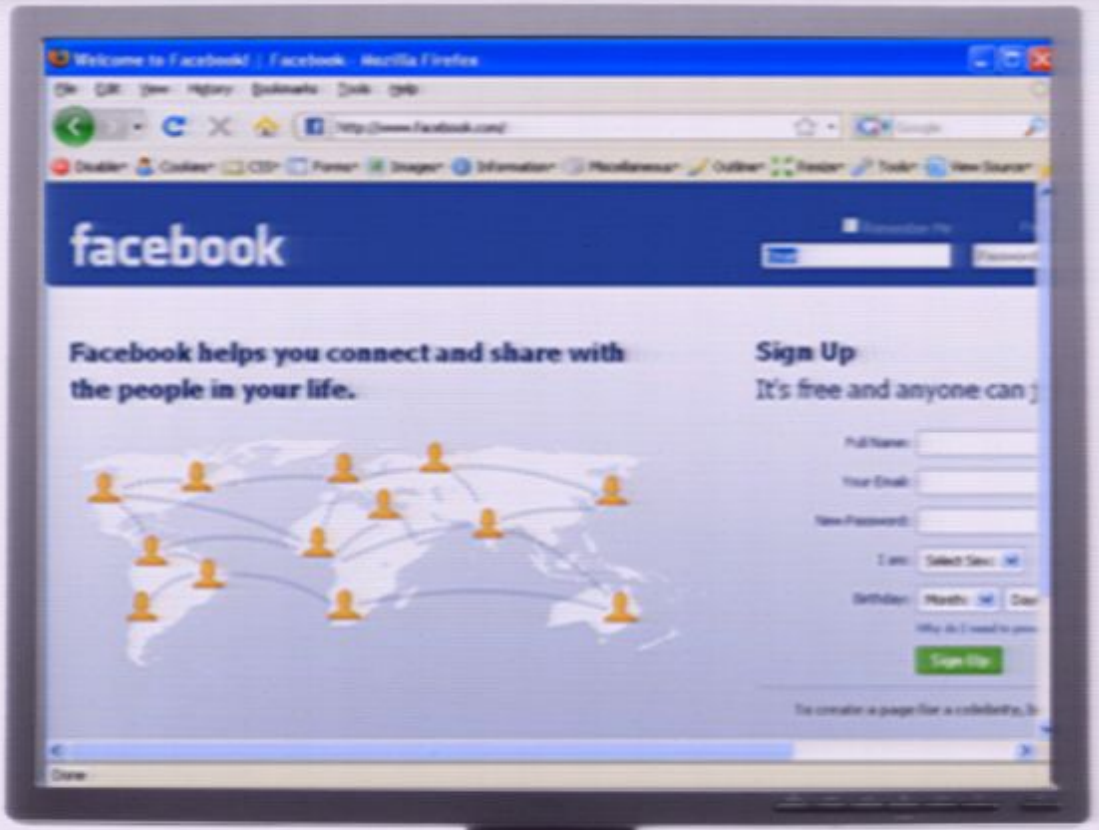

build satellite network


build satellite network

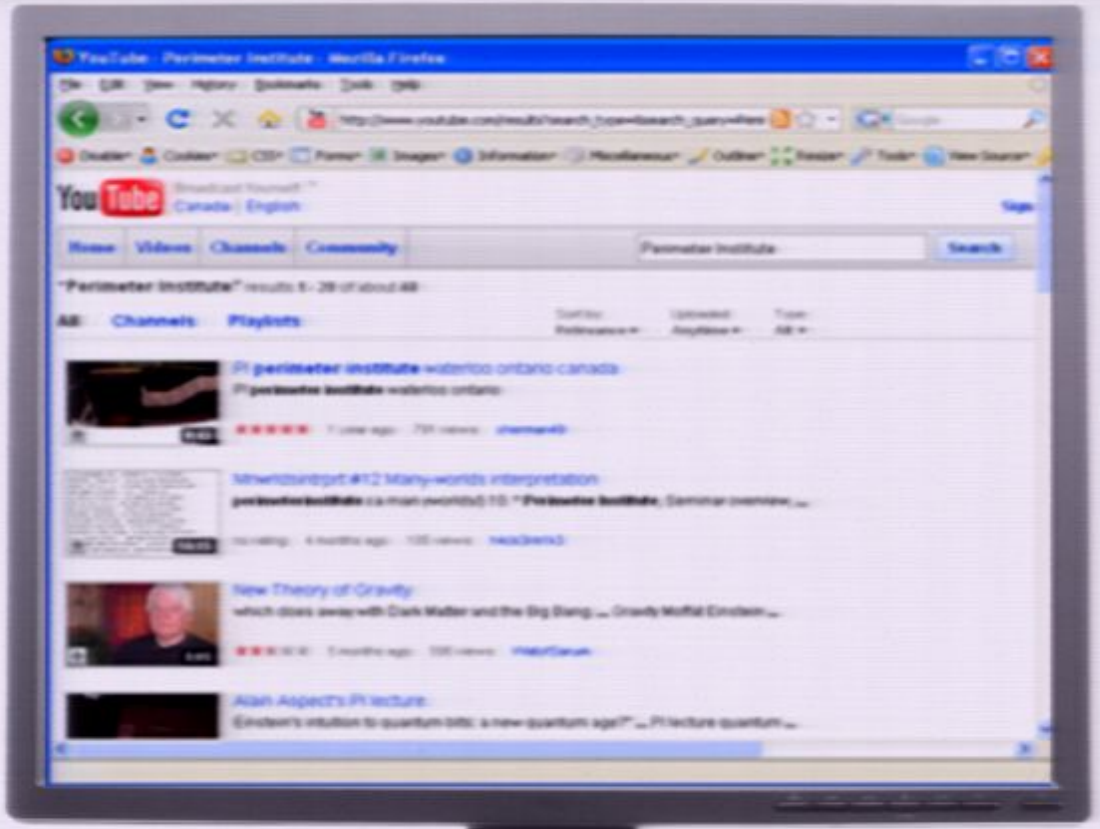
build internet



build internet



build internet



$$\nabla \cdot D = \rho$$

$$\nabla \cdot B = 0$$

$$\nabla \times E = -\frac{\partial B}{\partial t}$$

$$\nabla \times H = i + \frac{\partial D}{\partial t}$$

power of ideas

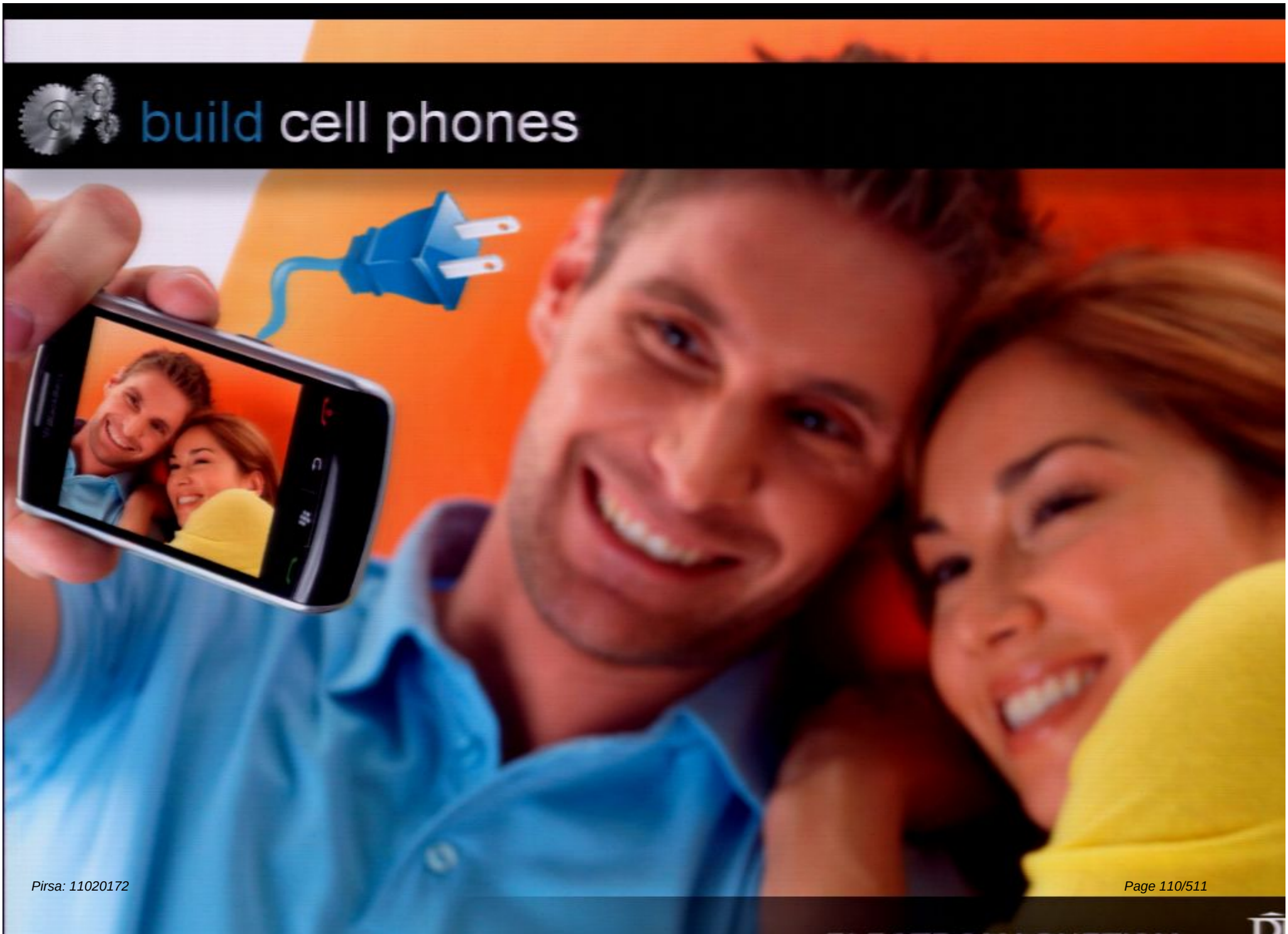
$$\nabla \cdot D = \rho$$

$$\nabla \cdot B = 0$$

$$\nabla \times E = -\frac{\partial B}{\partial t}$$

$$\nabla \times H = i + \frac{\partial D}{\partial t}$$

build cell phones


build cell phones

build everything we plug in

build everything we plug in

build everything we plug in

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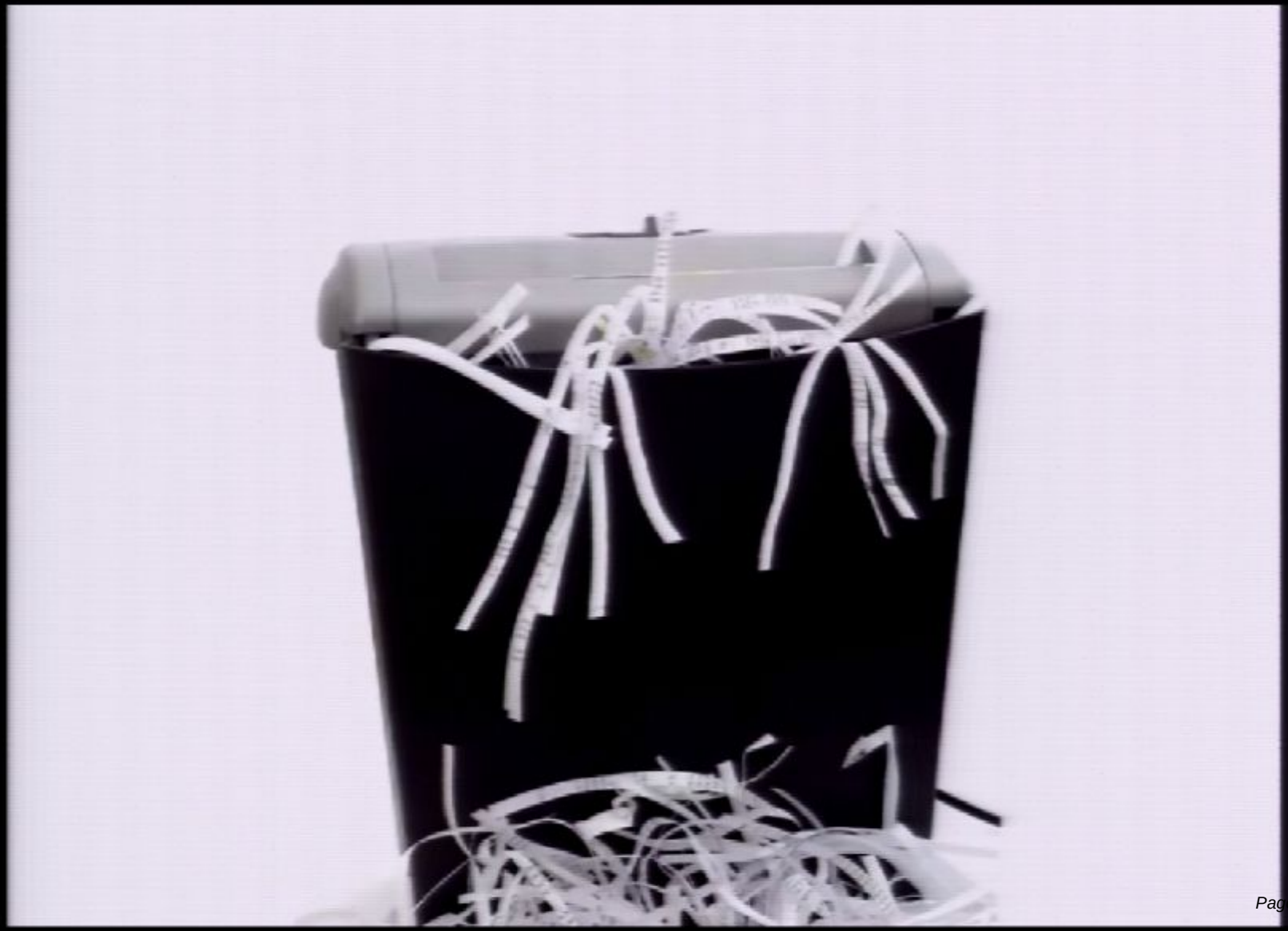

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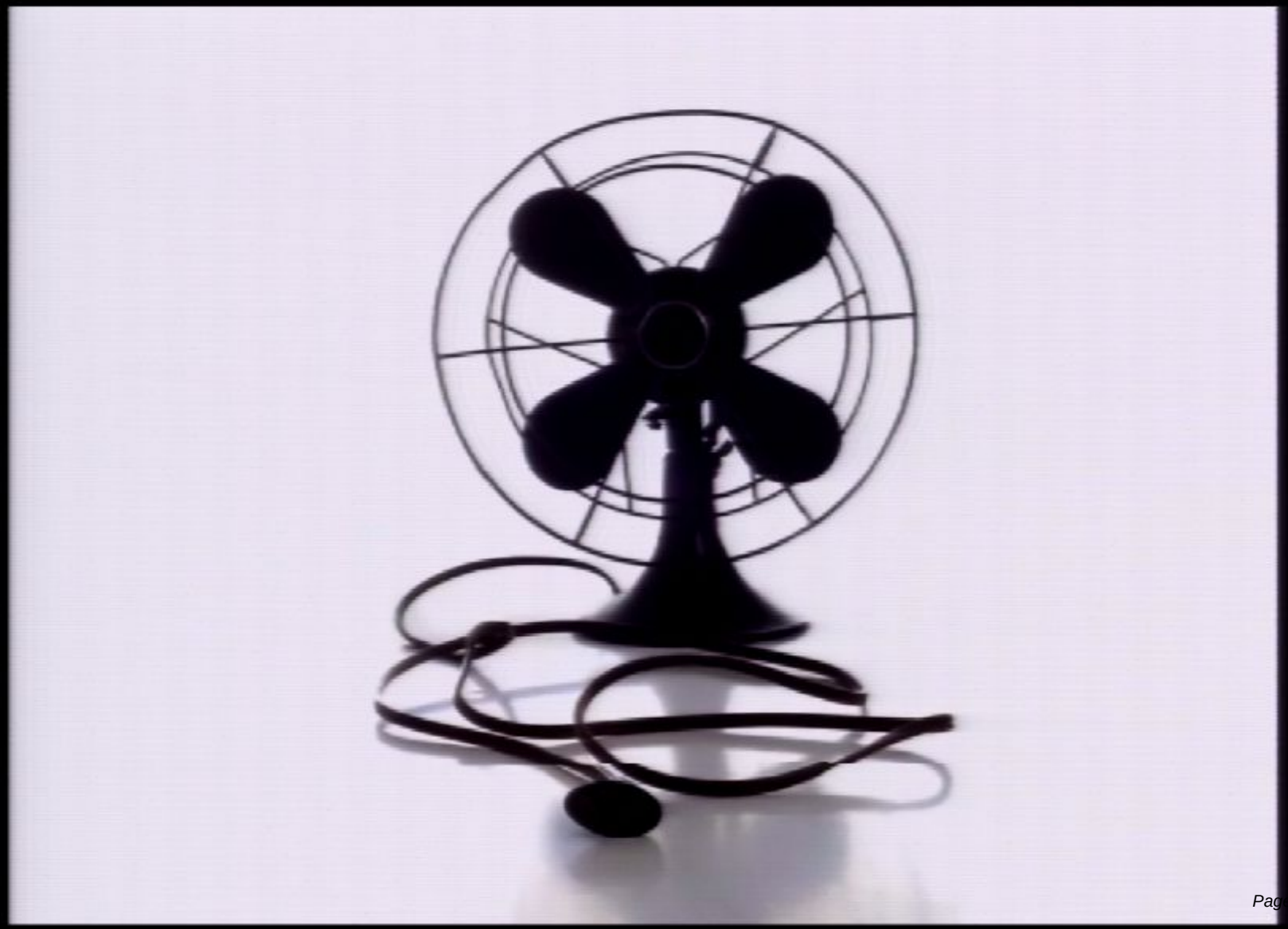

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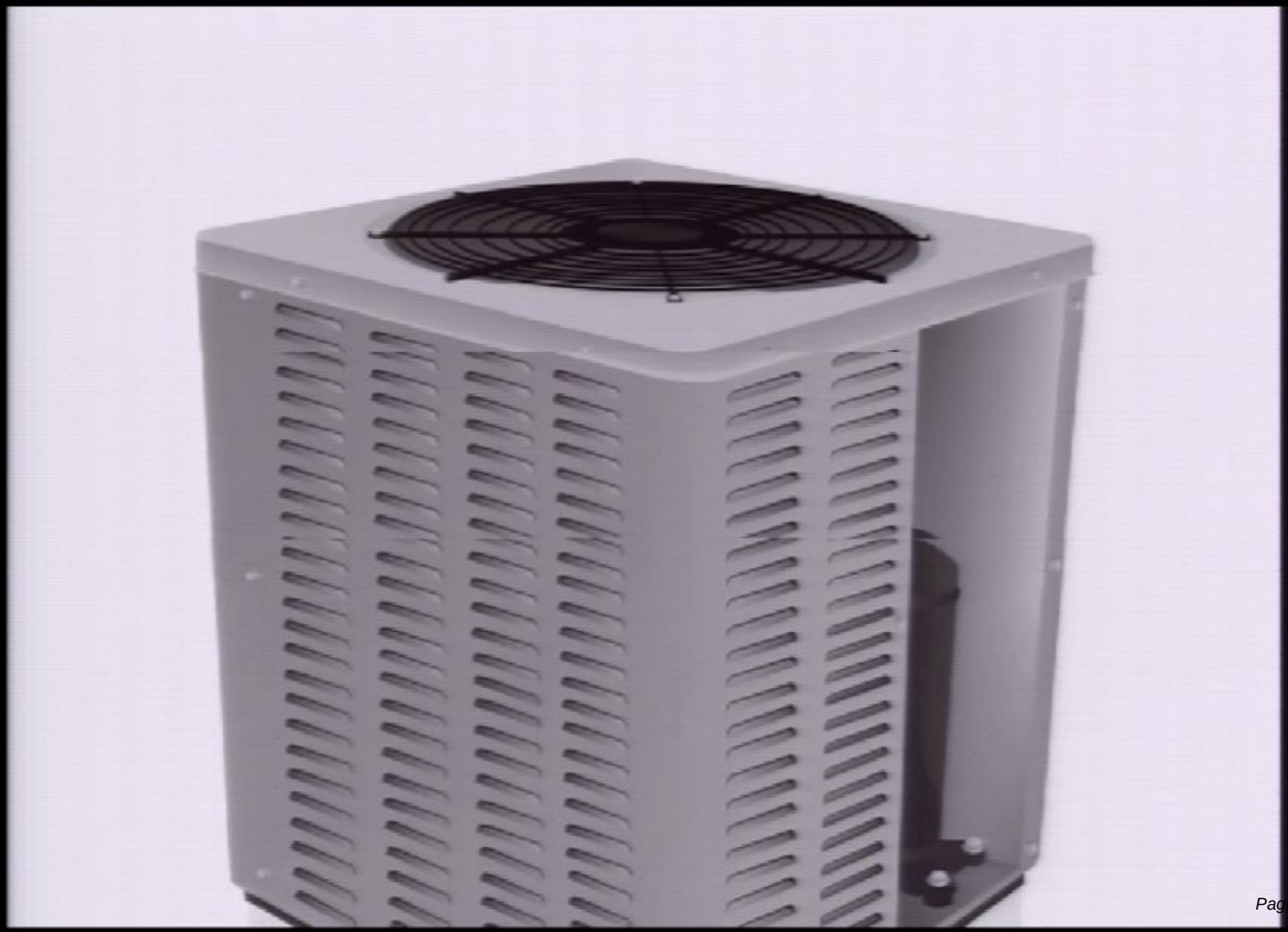

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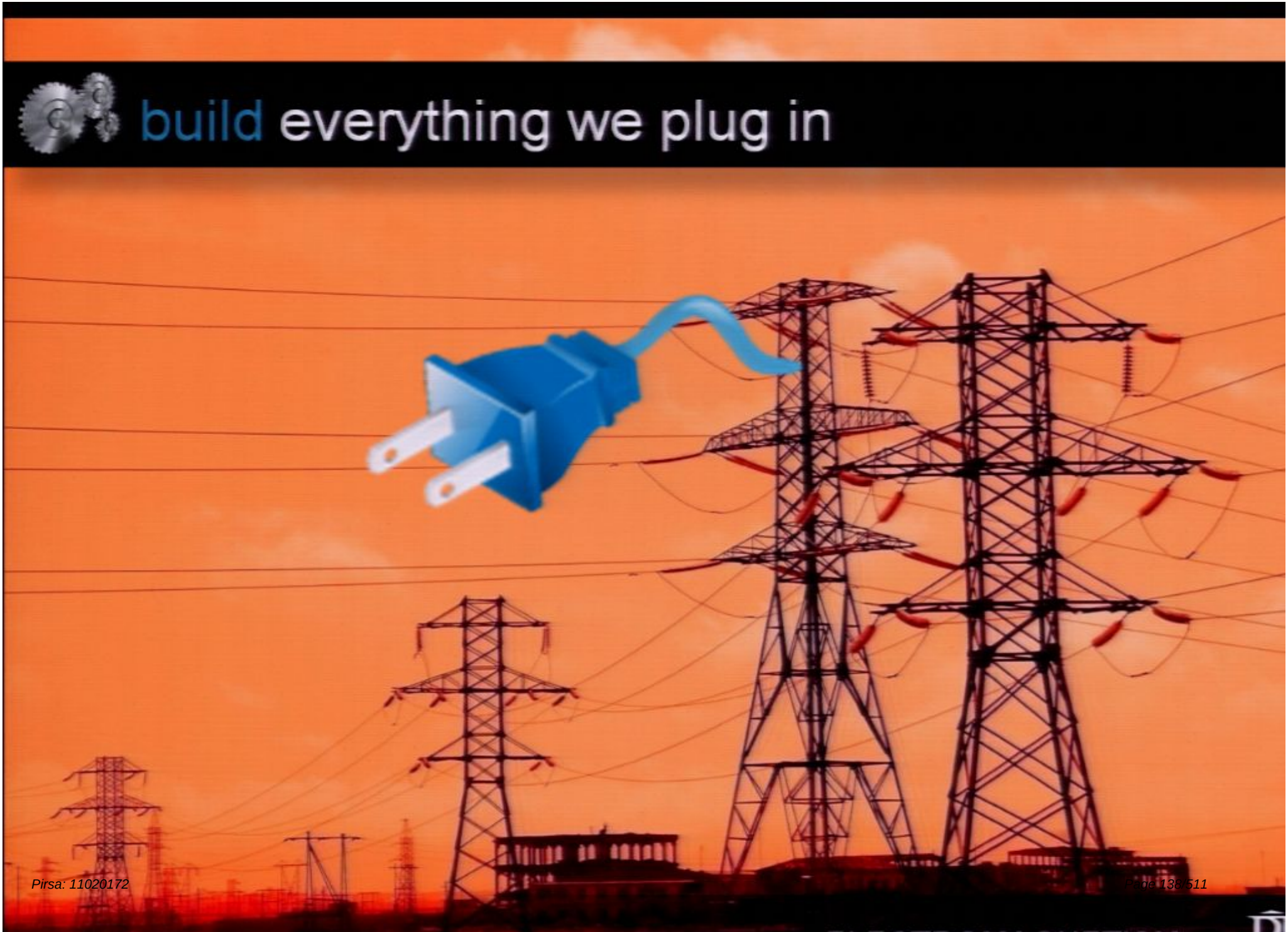
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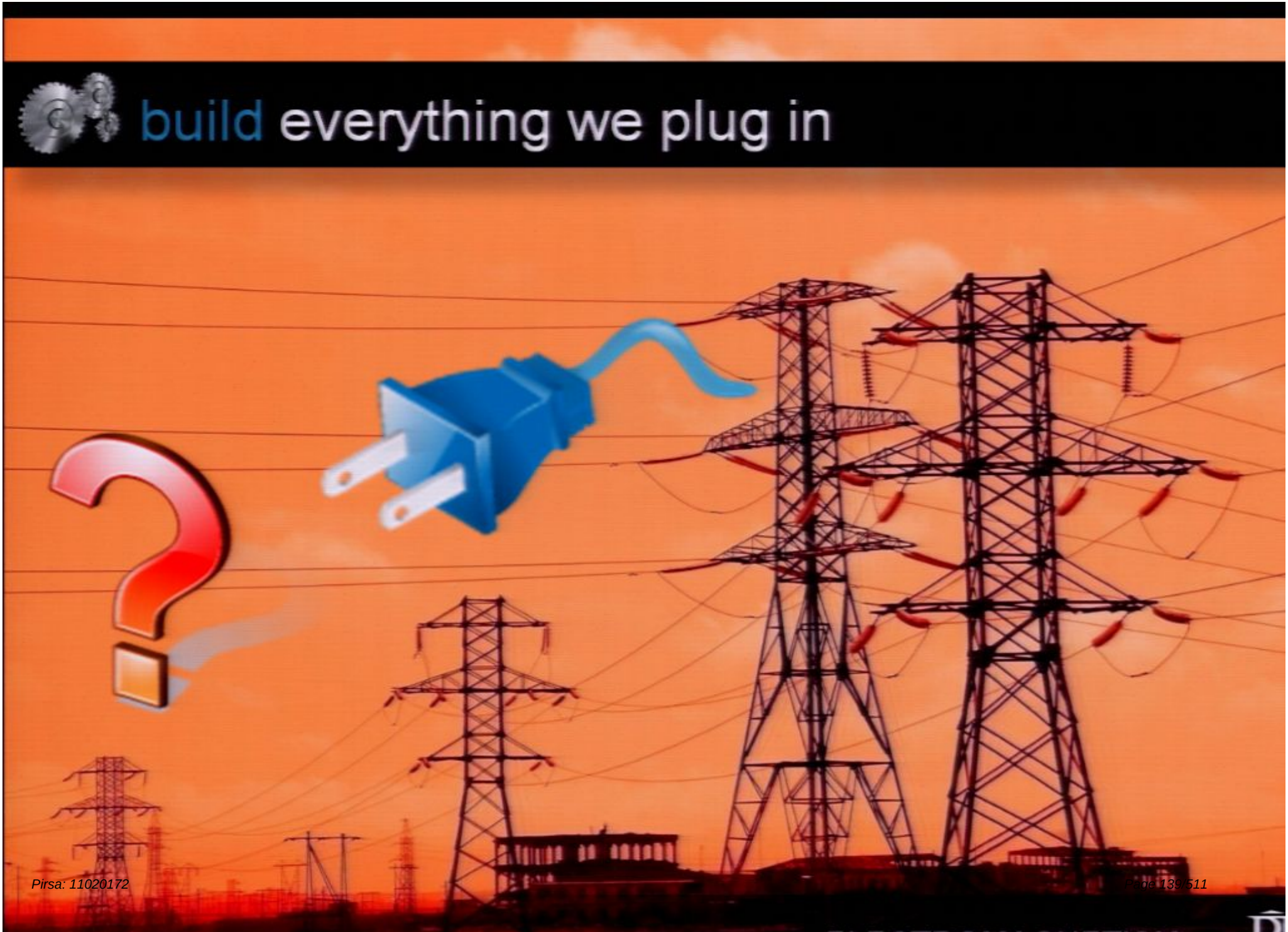
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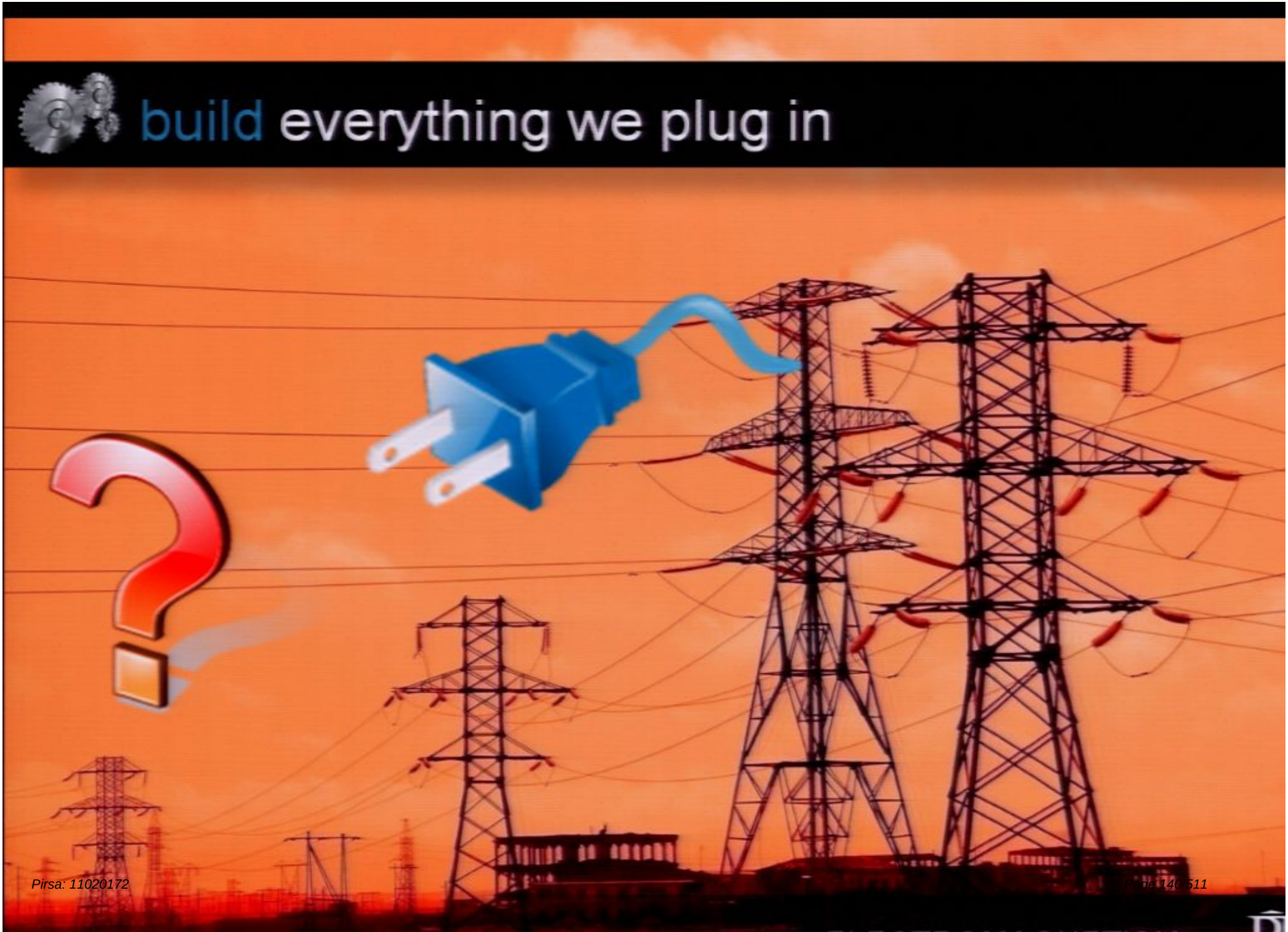

build everything we plug in

$$\nabla \cdot D = \rho$$

$$\nabla \cdot B = 0$$

$$\nabla \times E = -\frac{\partial B}{\partial t}$$

$$\nabla \times H = i + \frac{\partial D}{\partial t}$$

power of ideas

$$\nabla \cdot D = \rho$$

$$\nabla \cdot B = 0$$

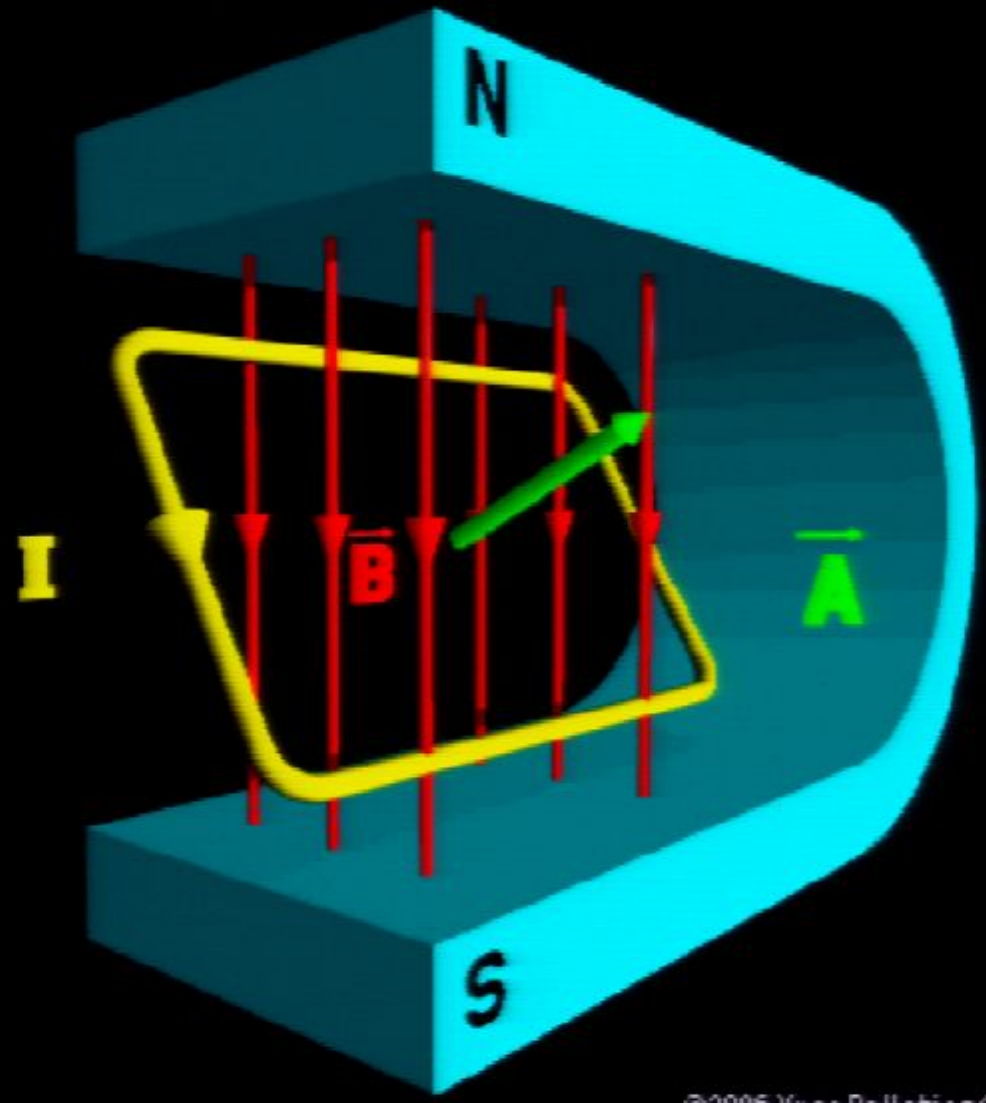
$$\nabla \times E = -\frac{\partial B}{\partial t}$$

$$\nabla \times H = i + \frac{\partial D}{\partial t}$$

build cool stuff

electric power generators

build power generators



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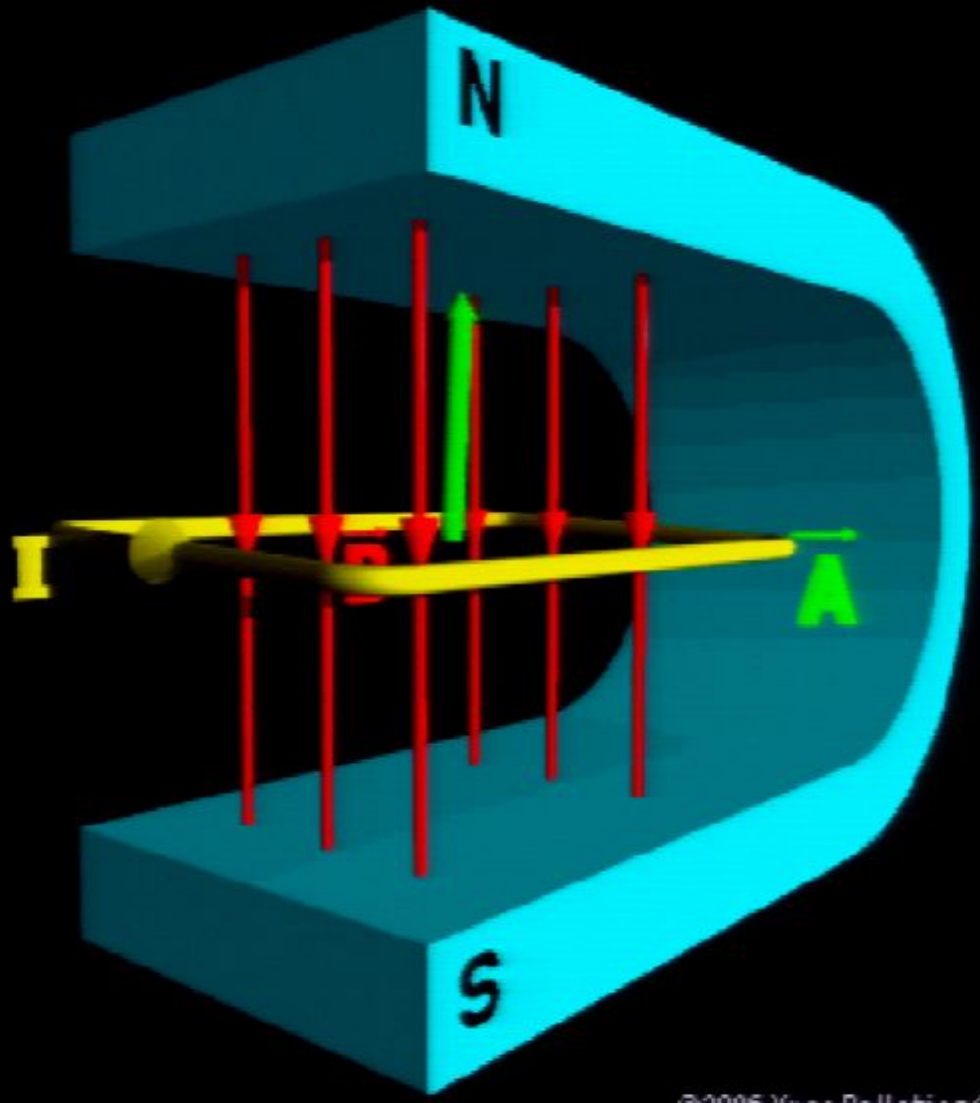

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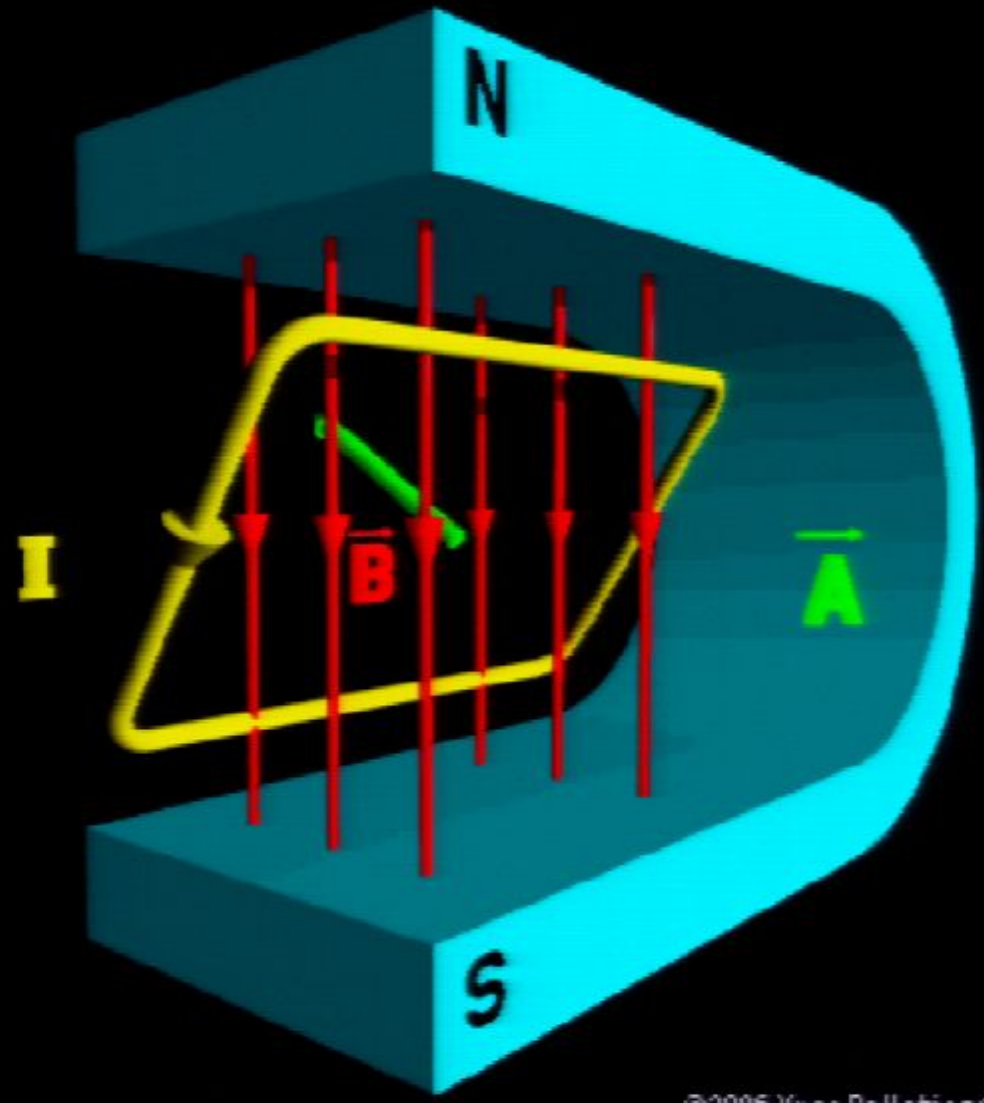

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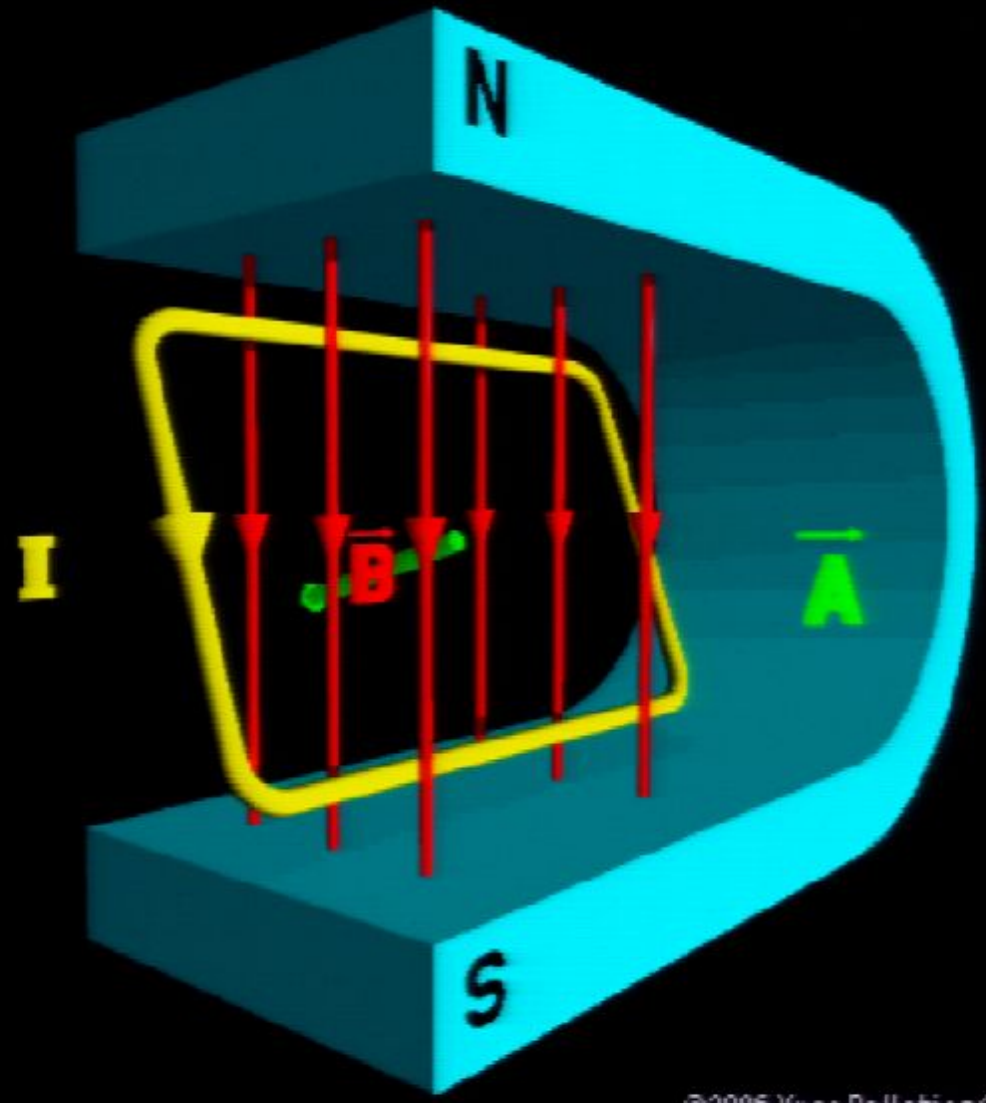

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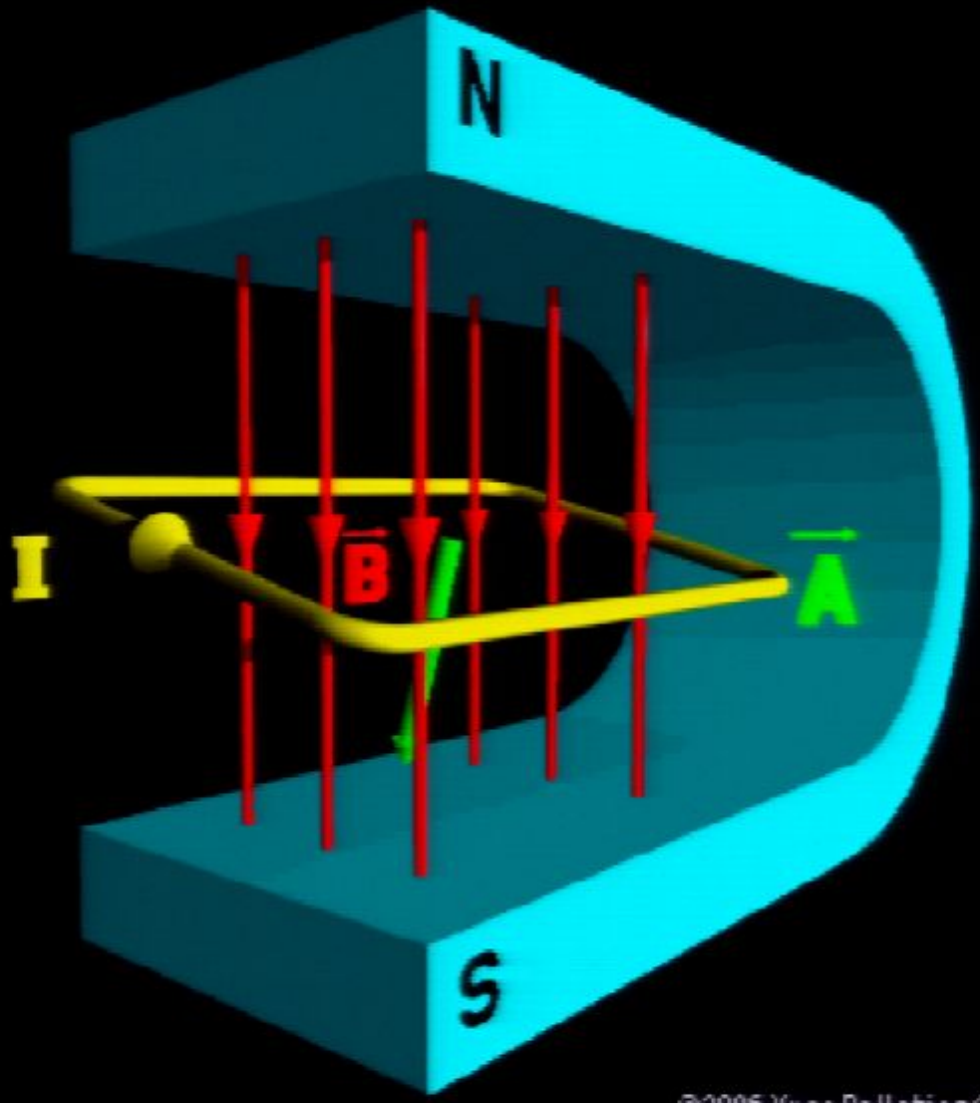

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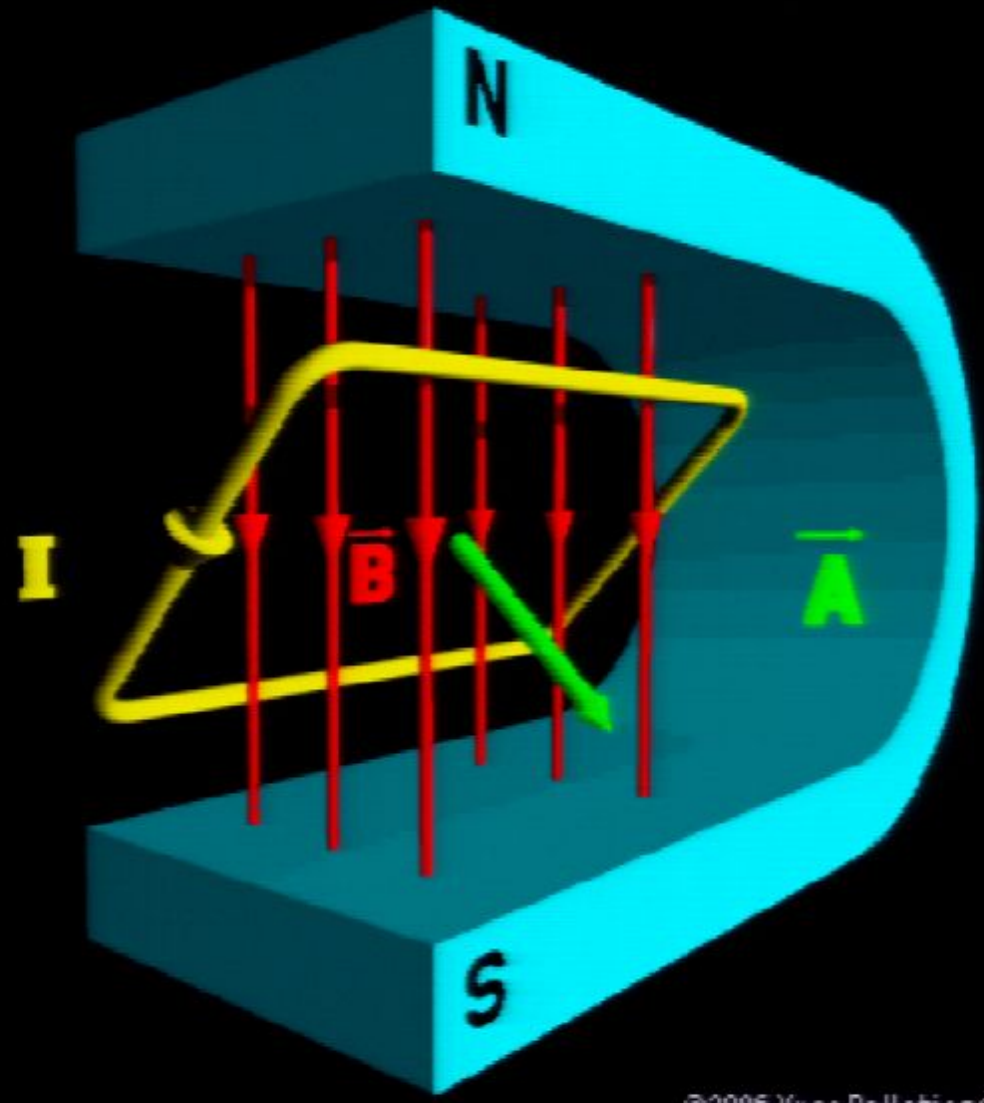

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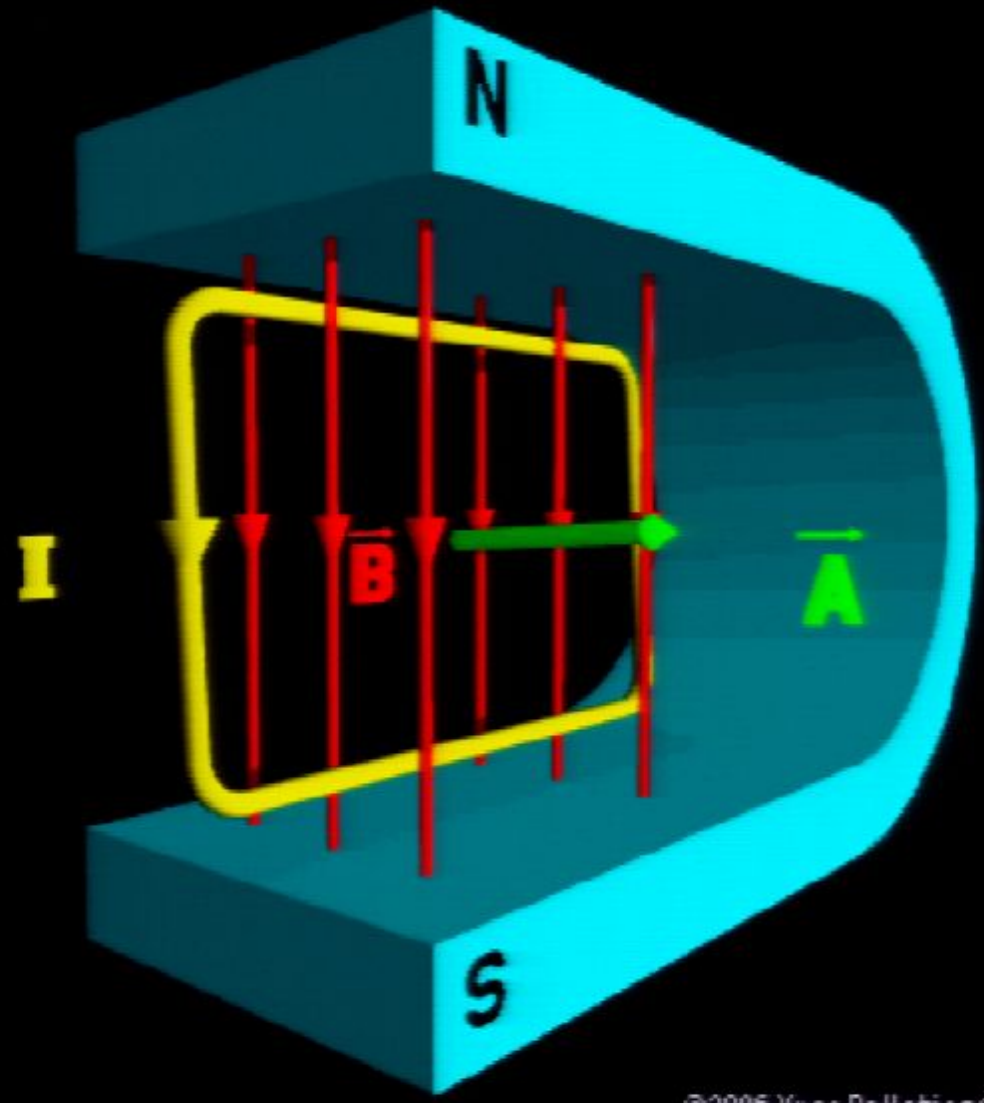

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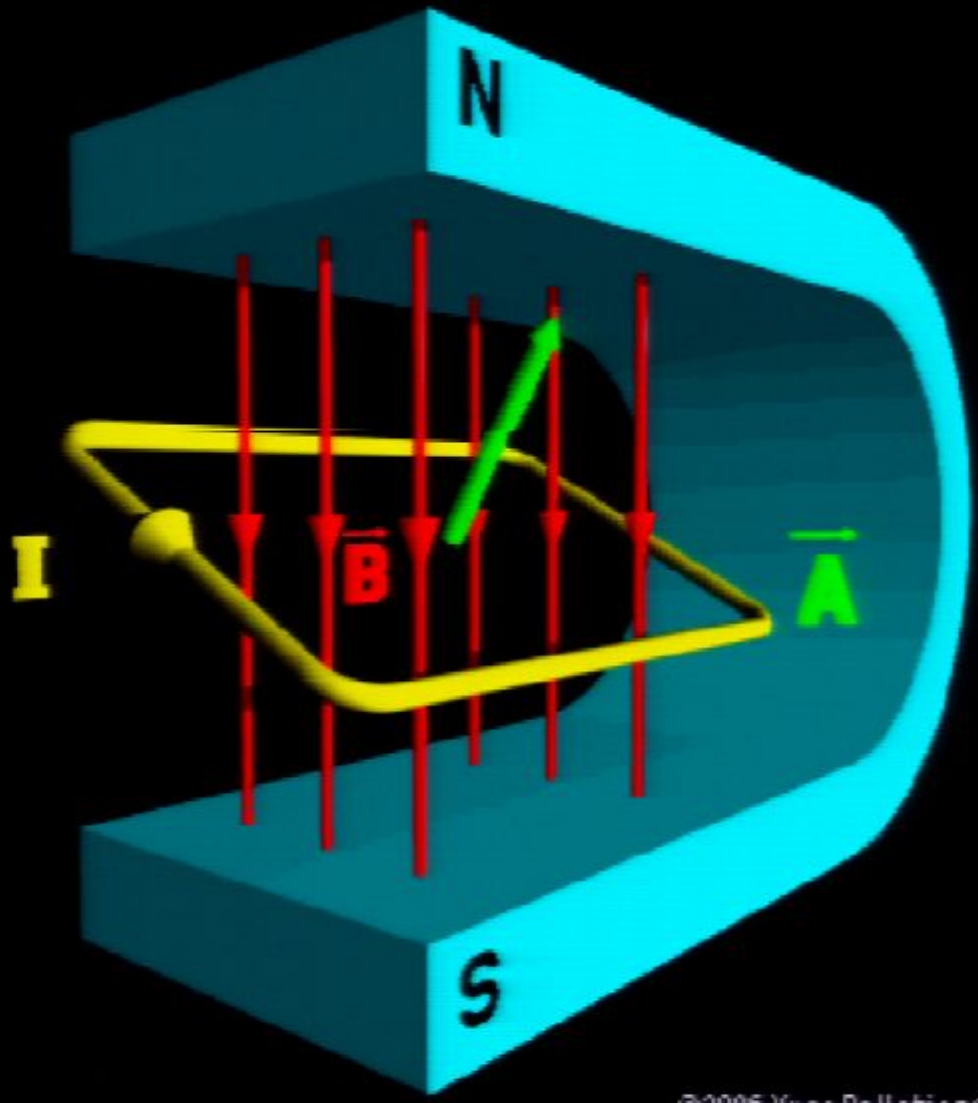

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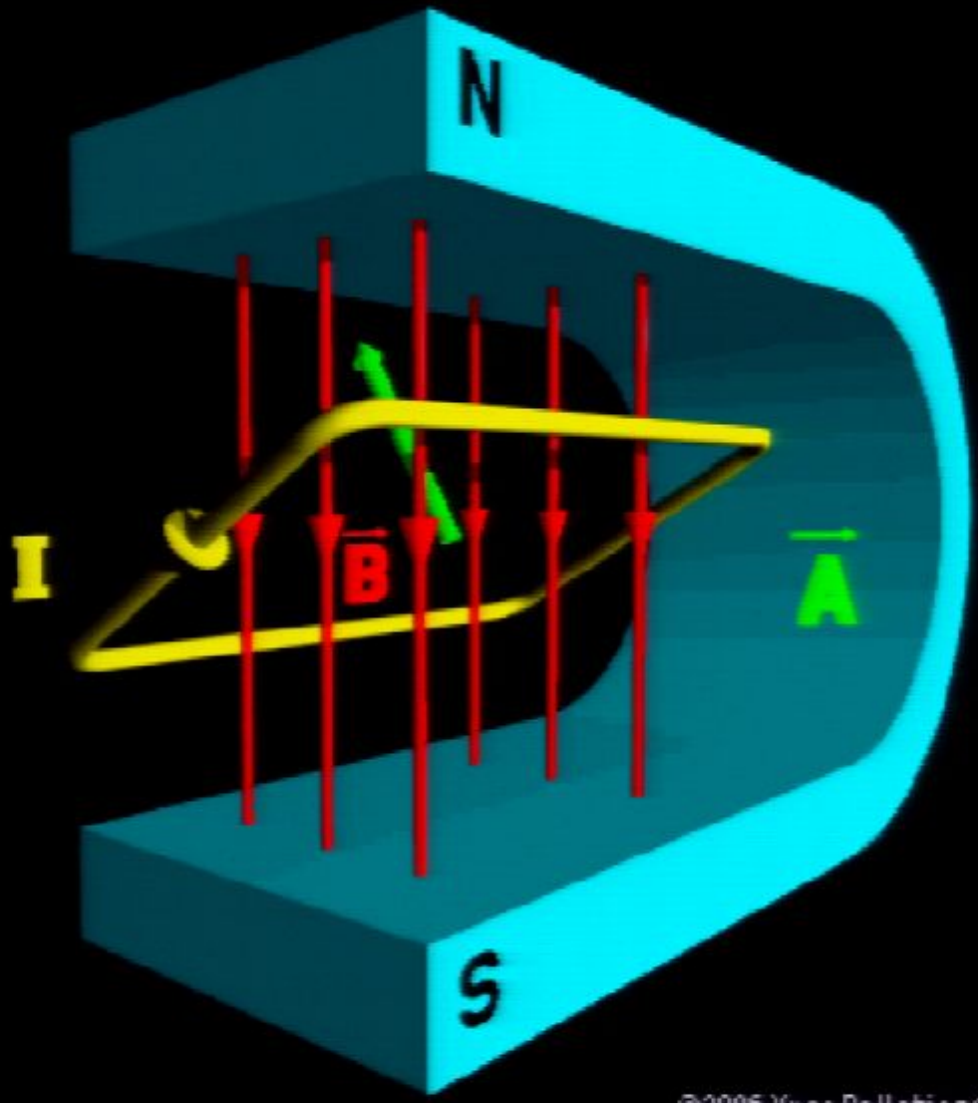

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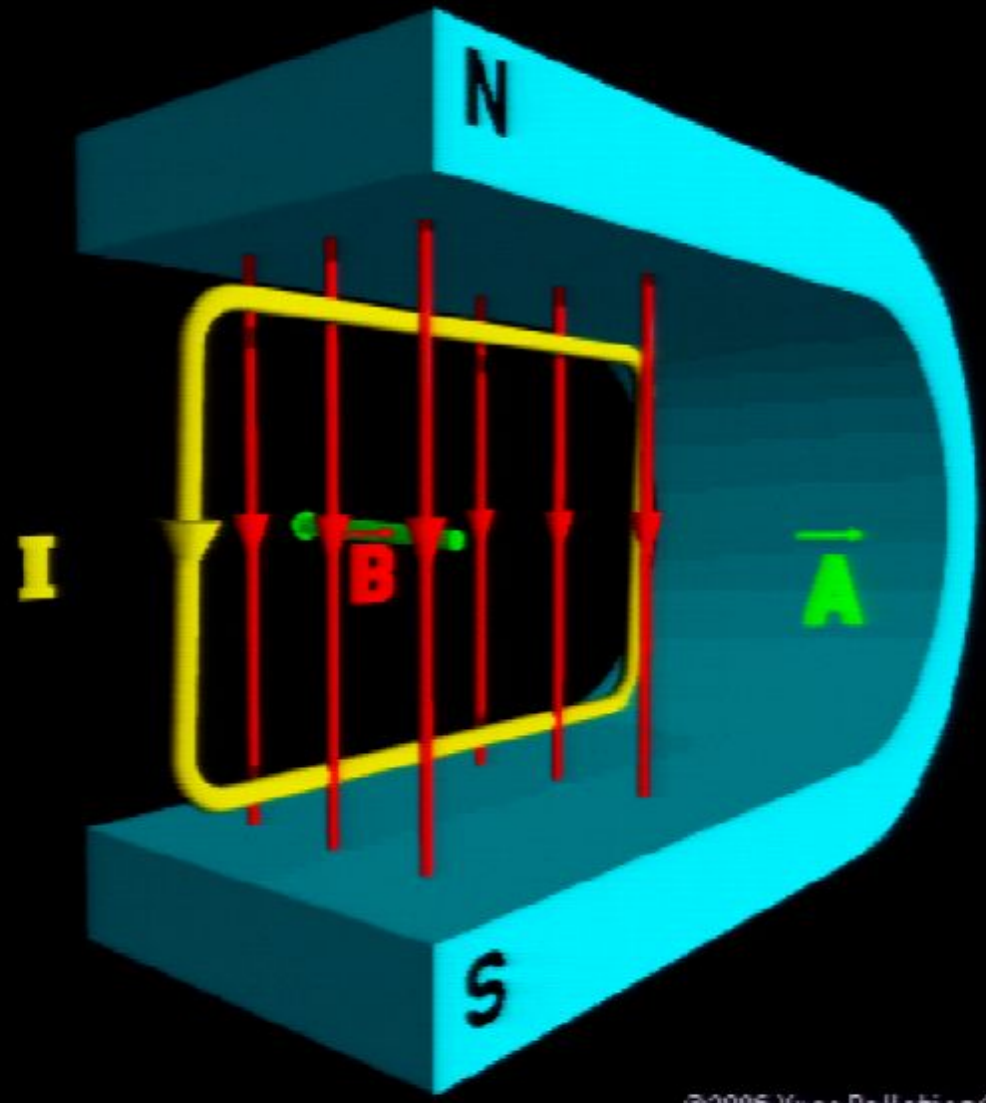

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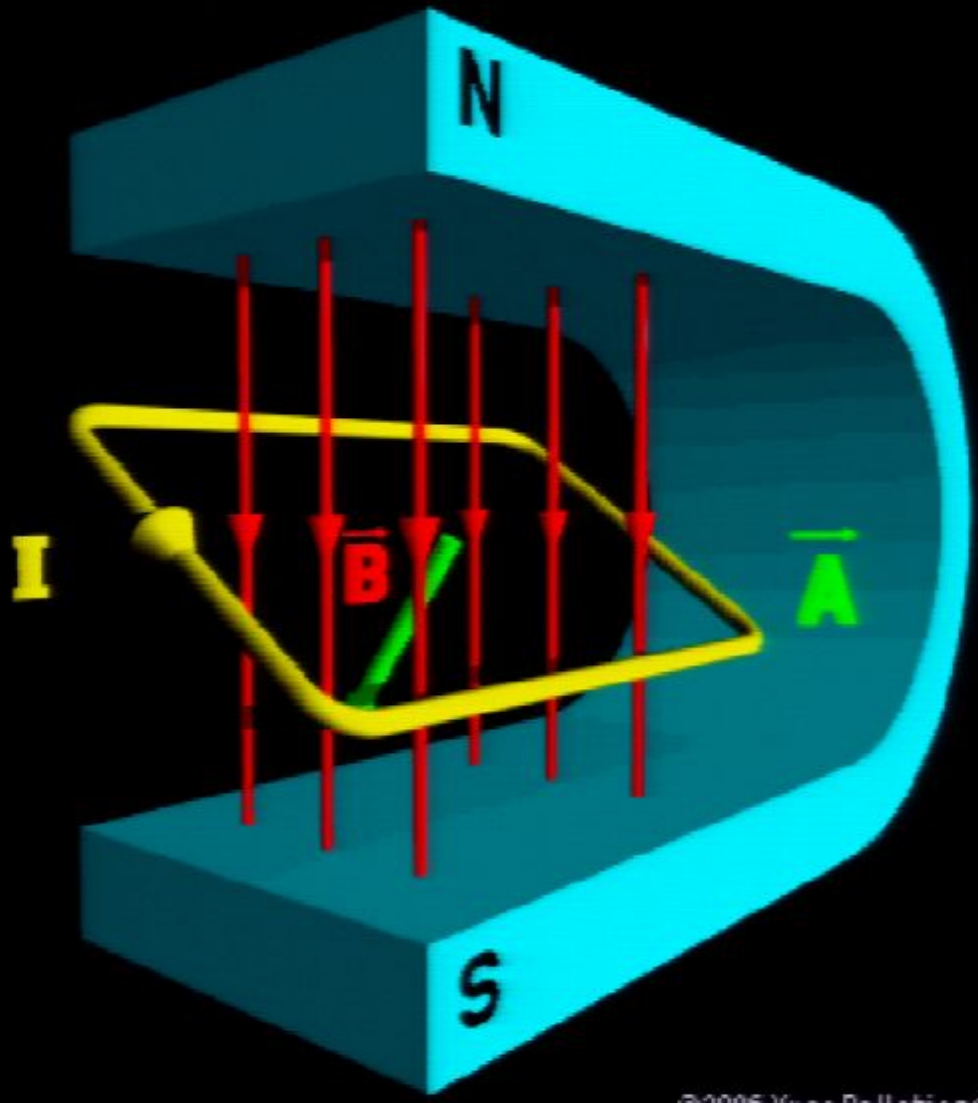

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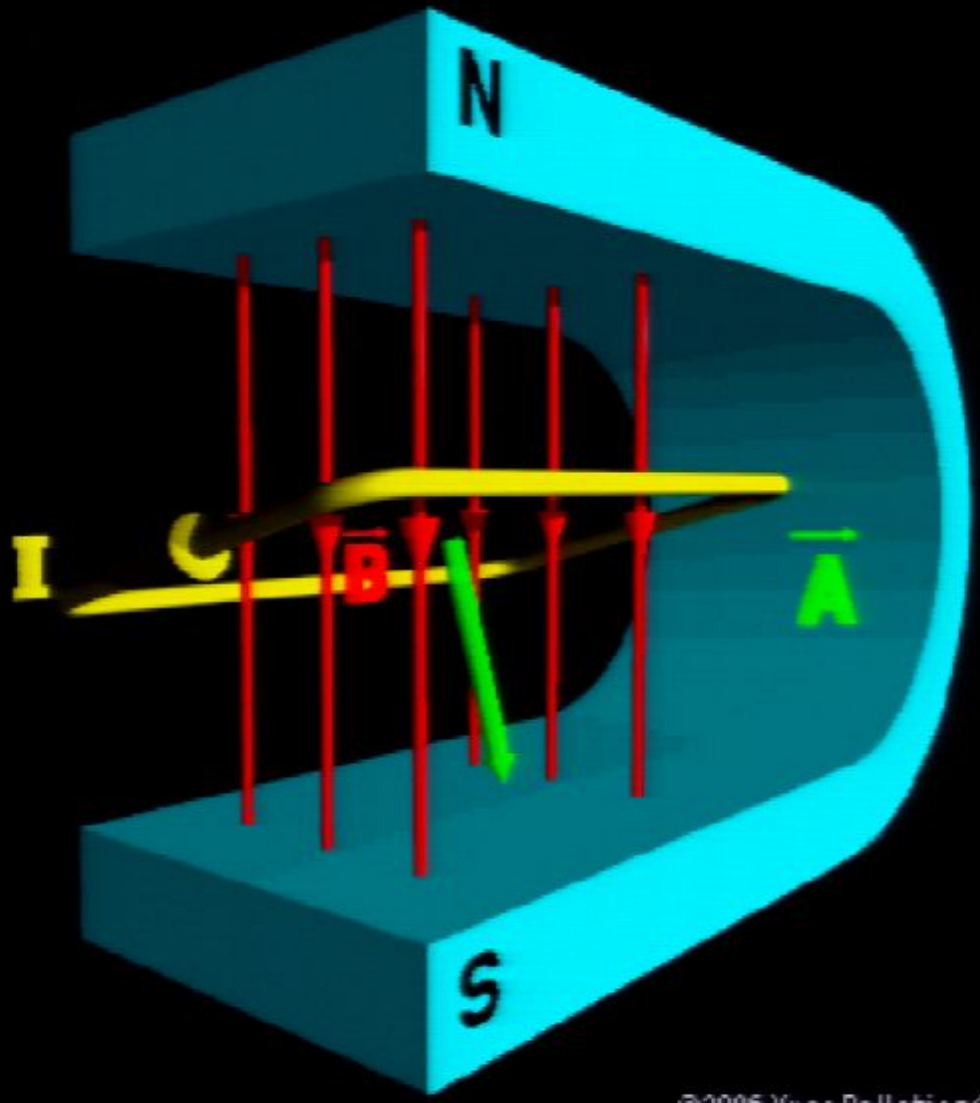

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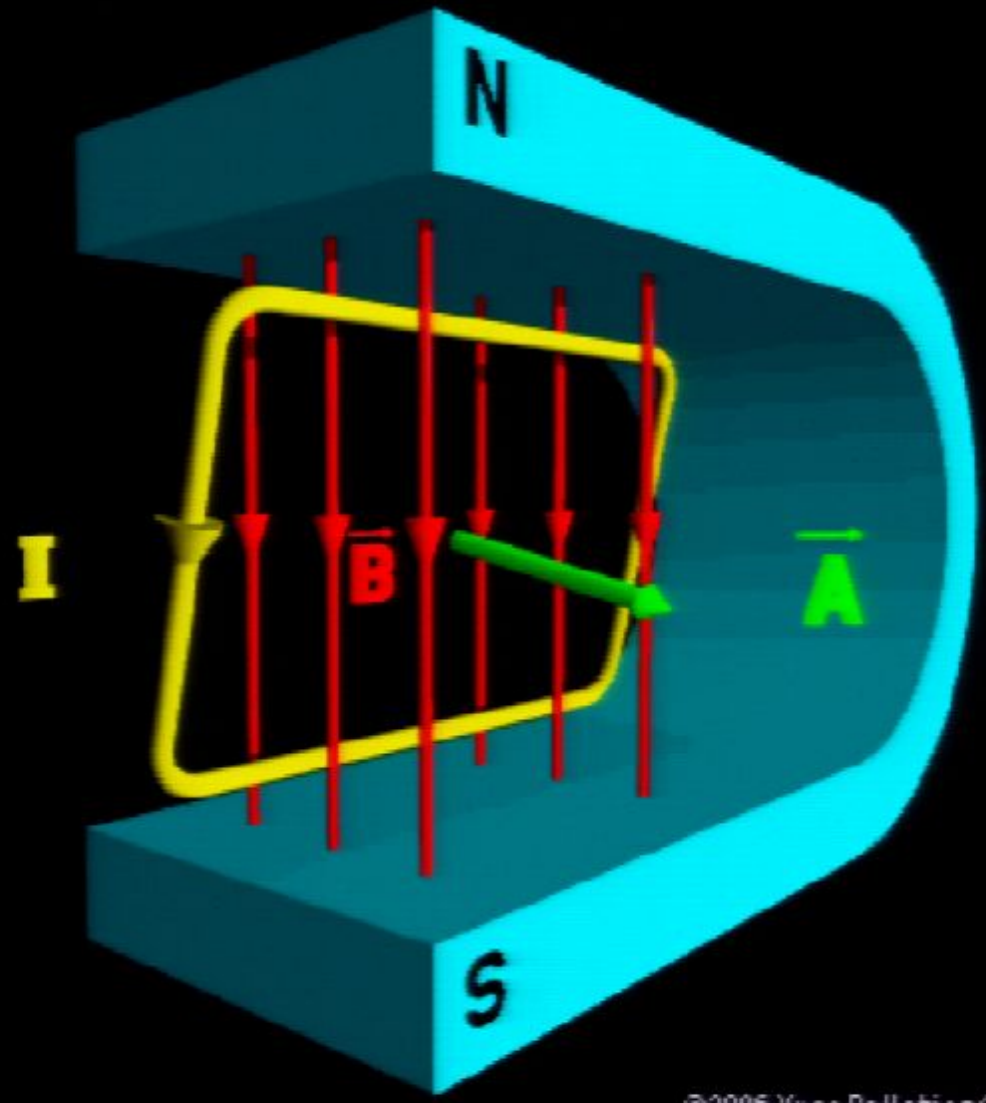

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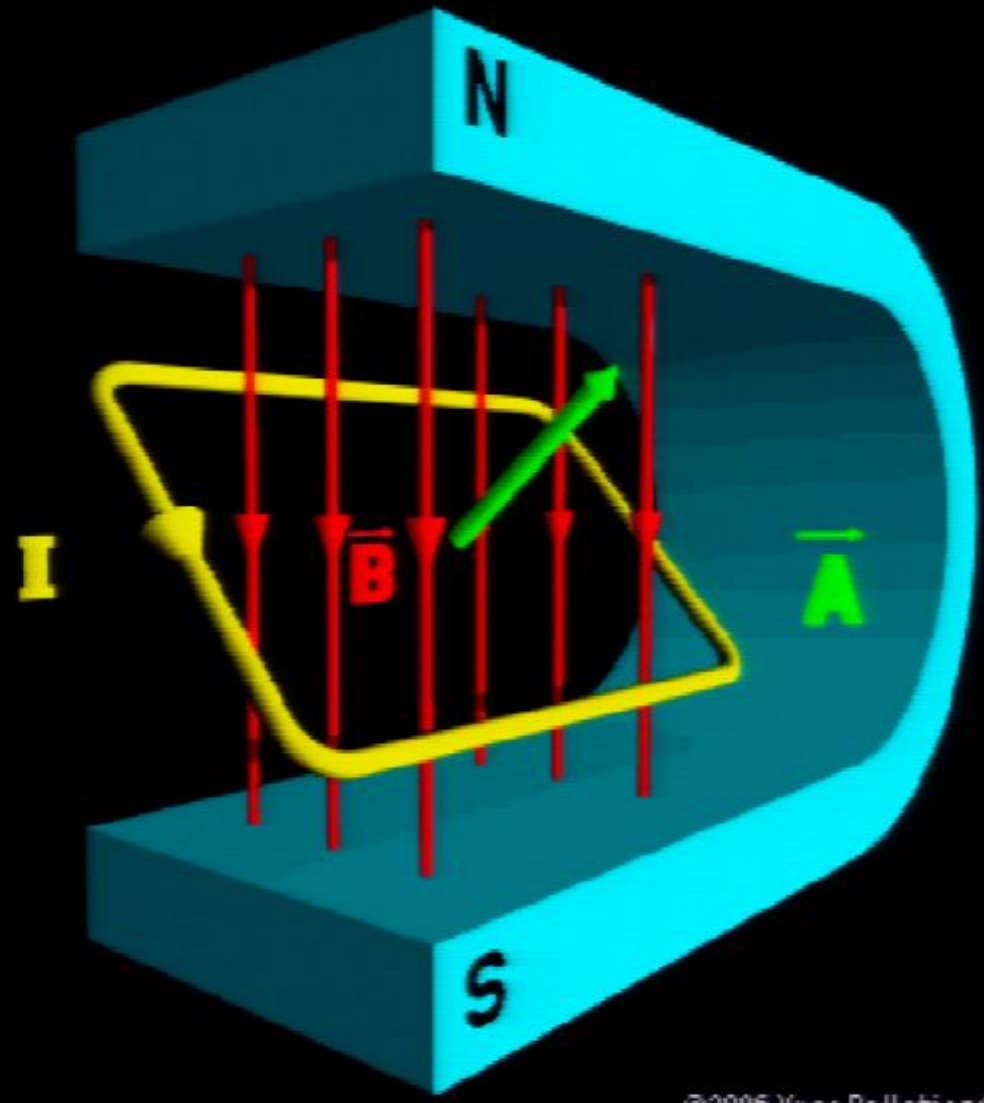

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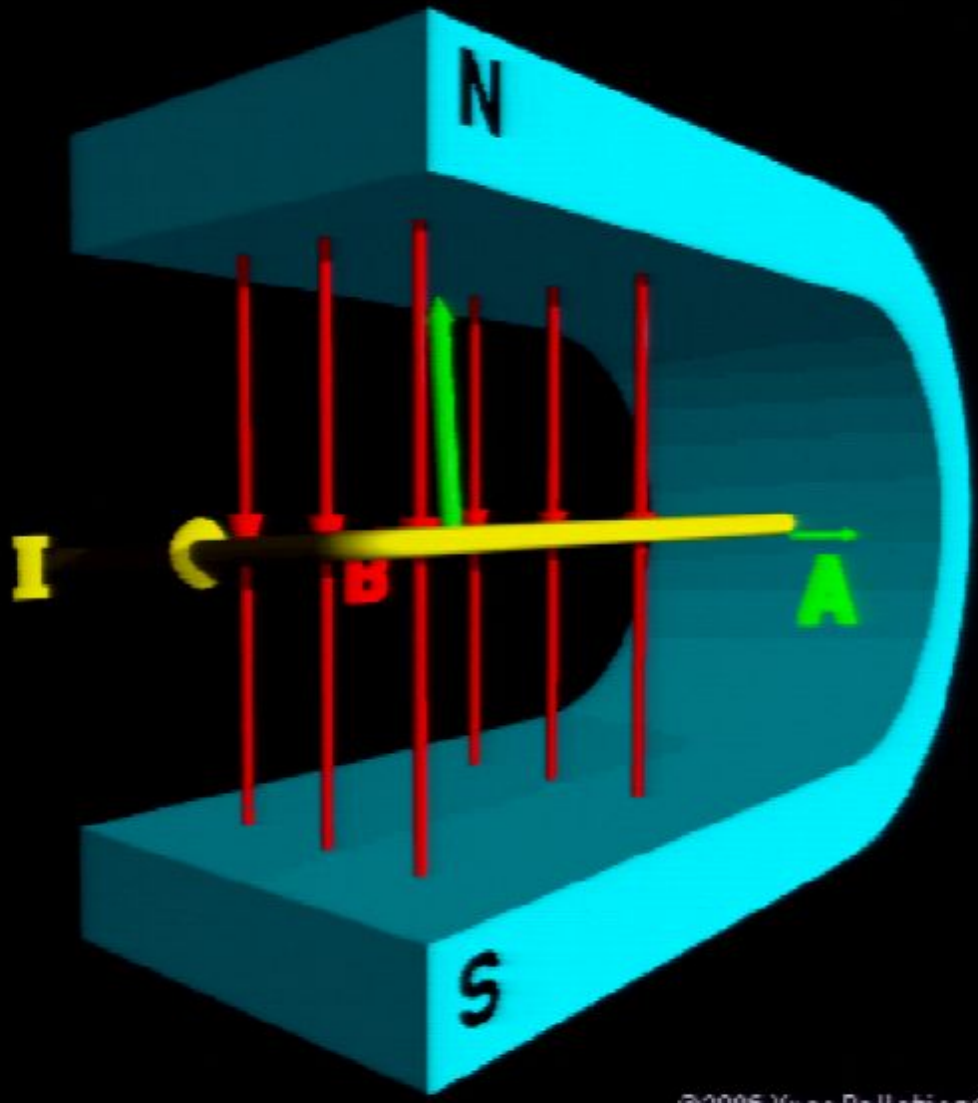

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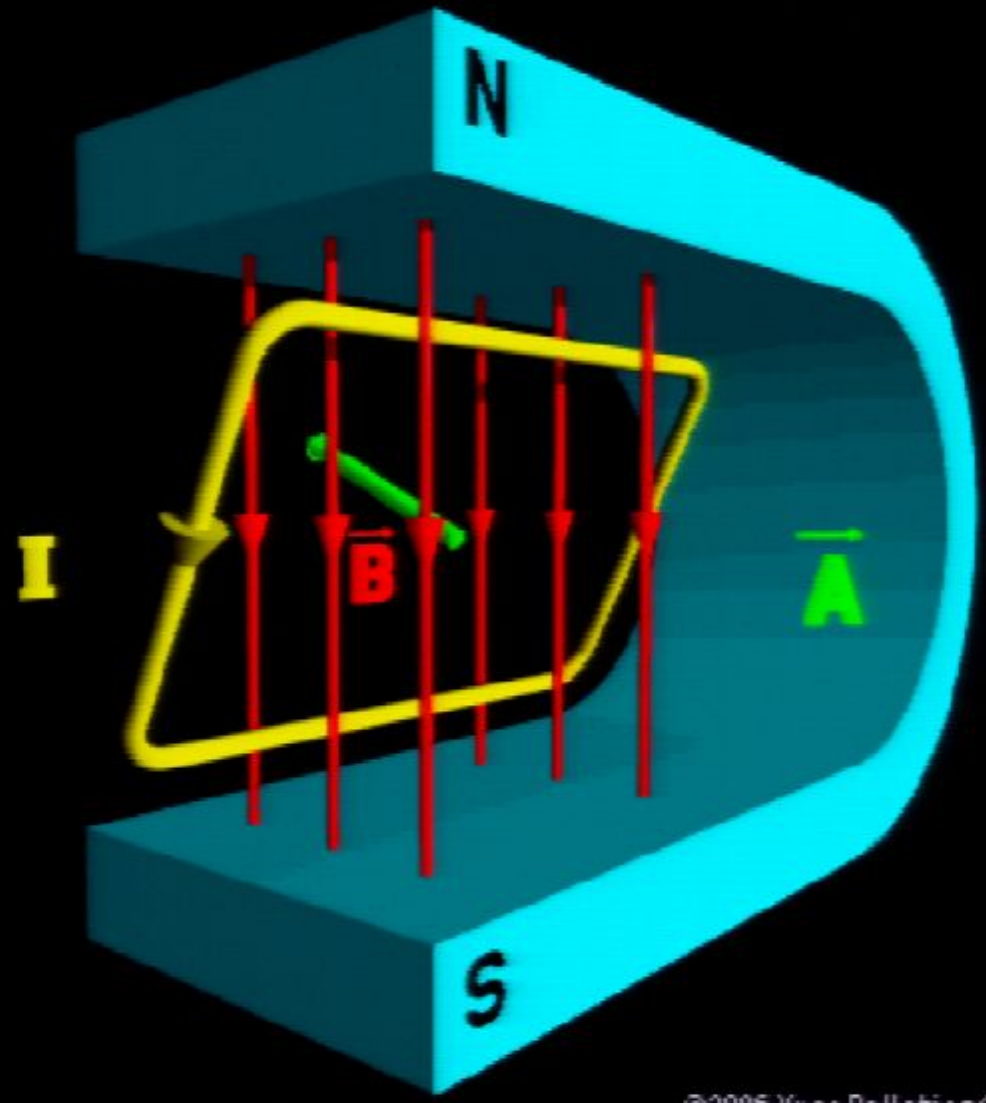

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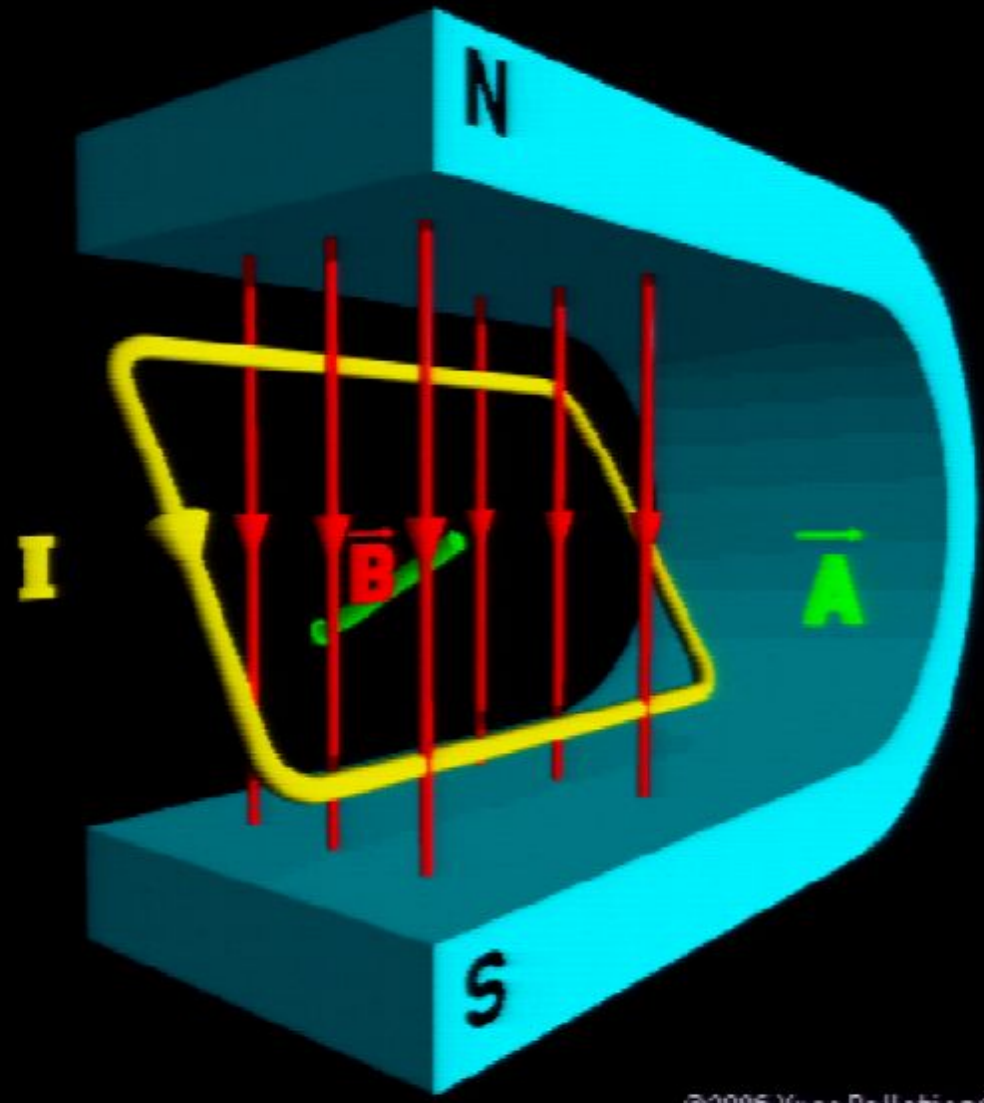

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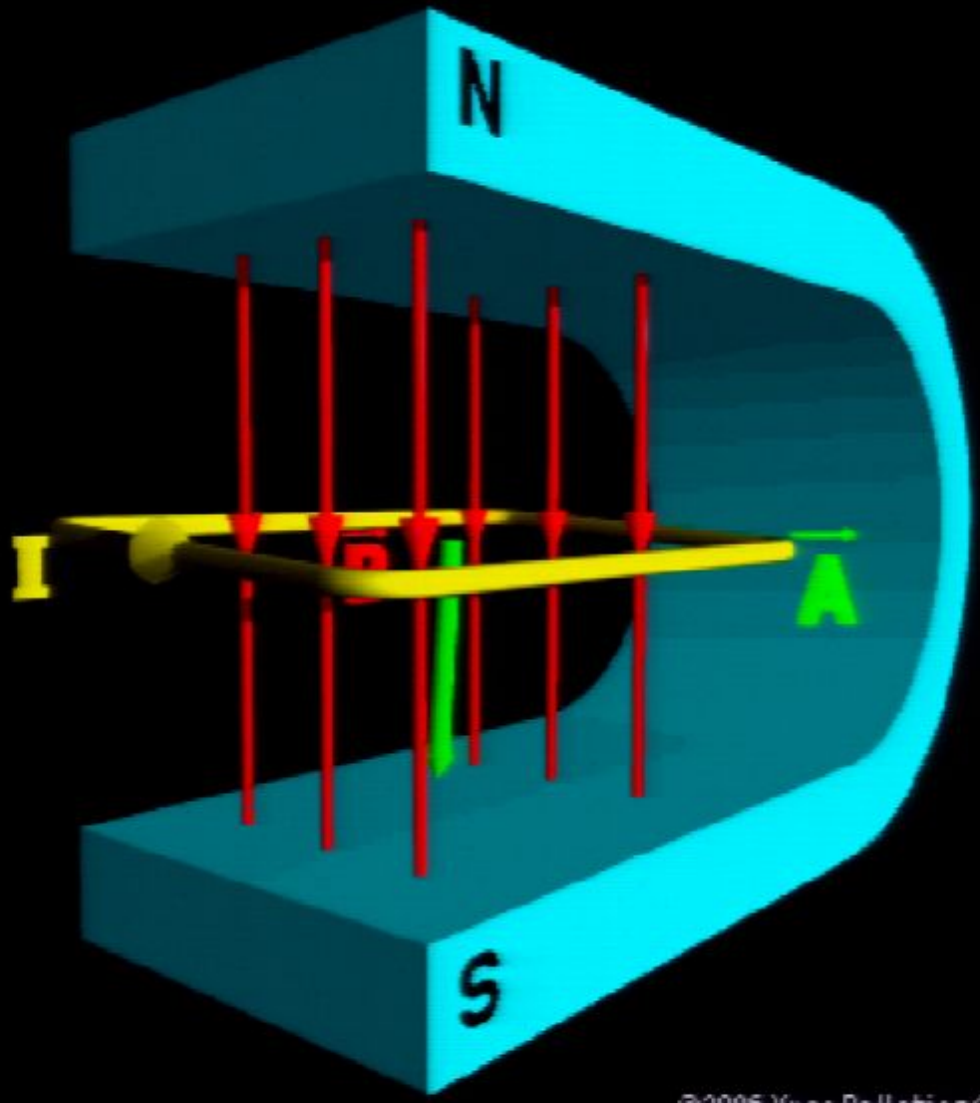

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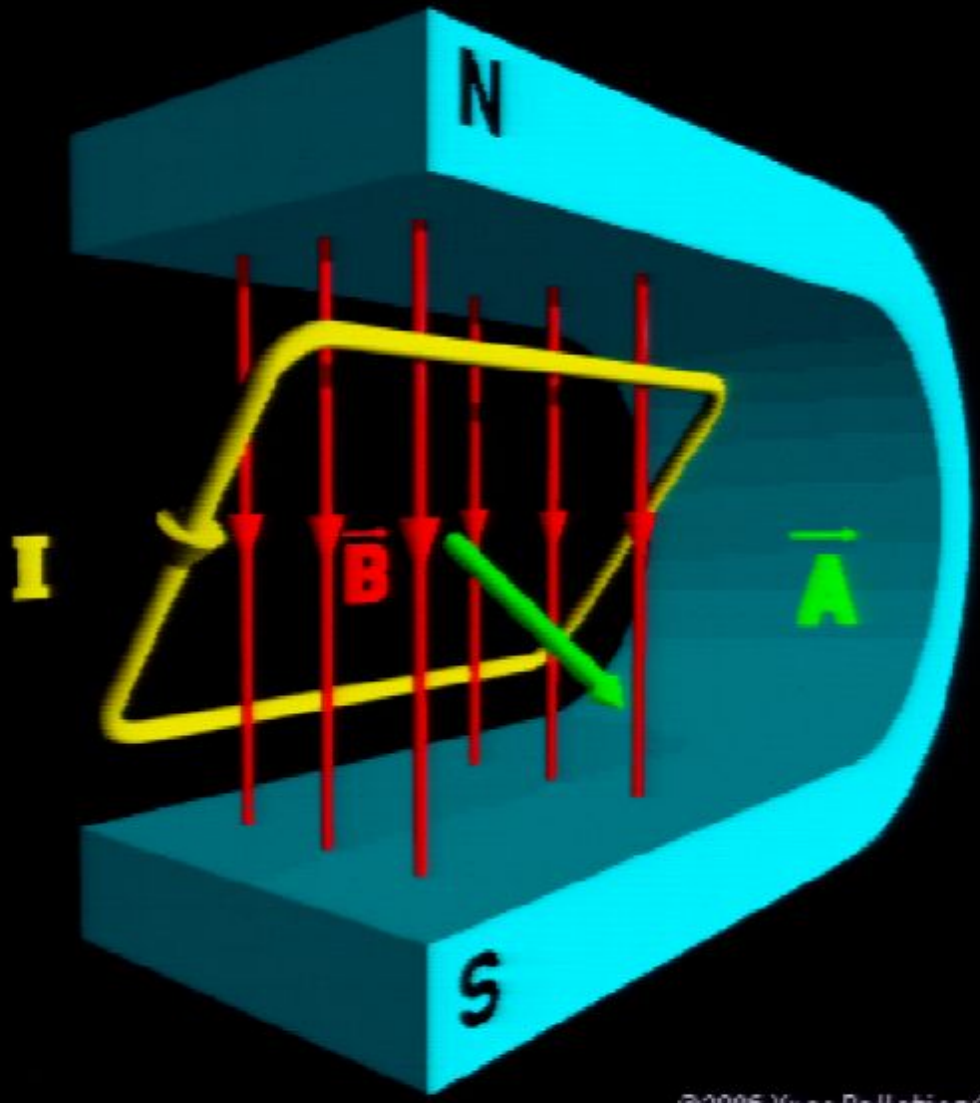

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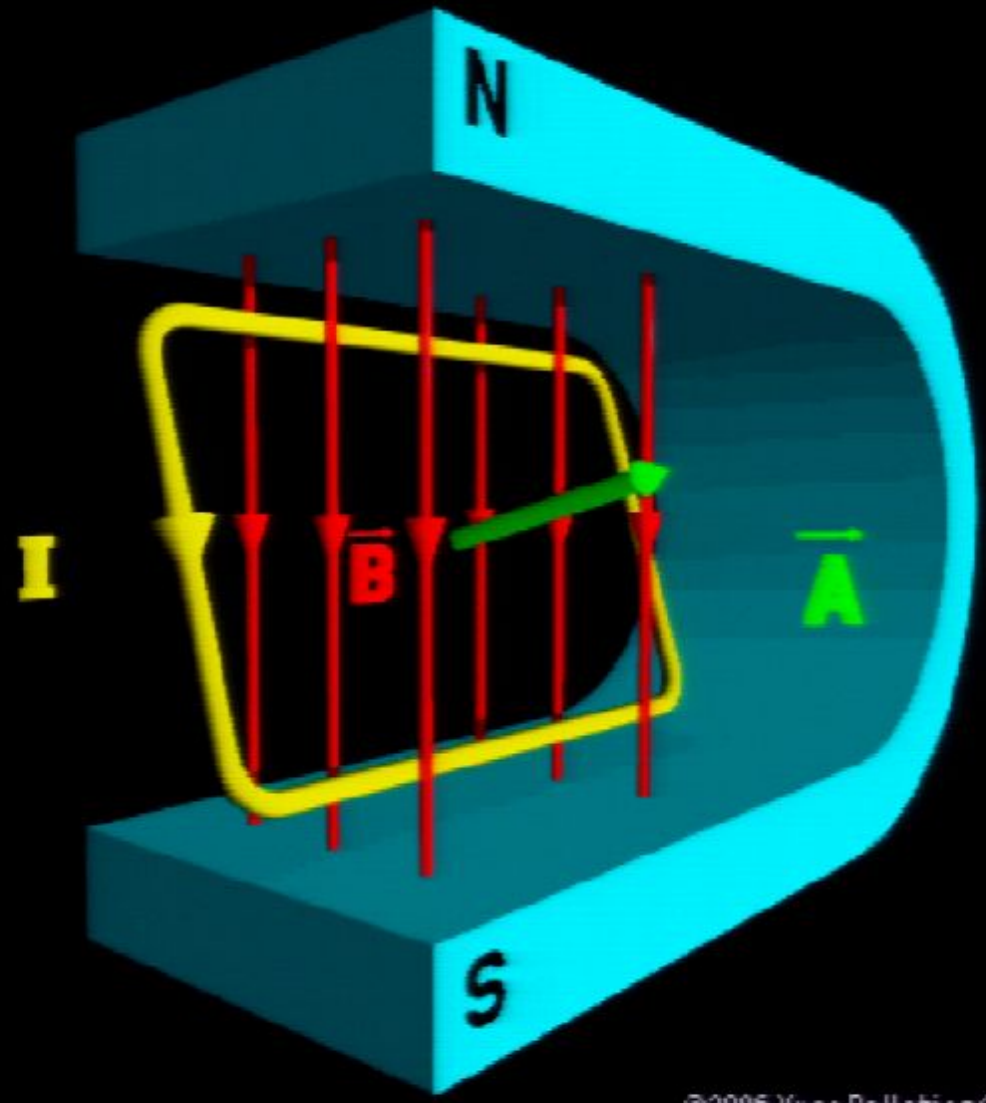

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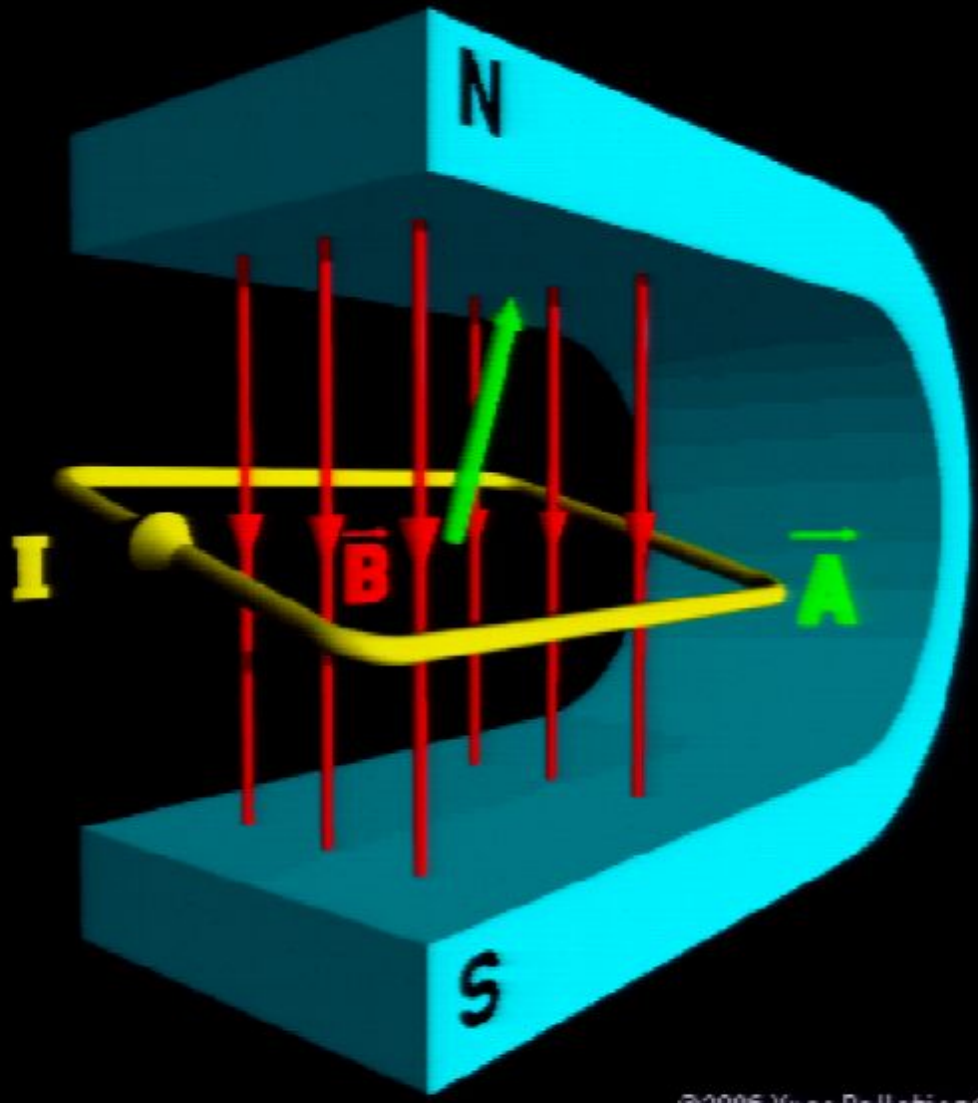

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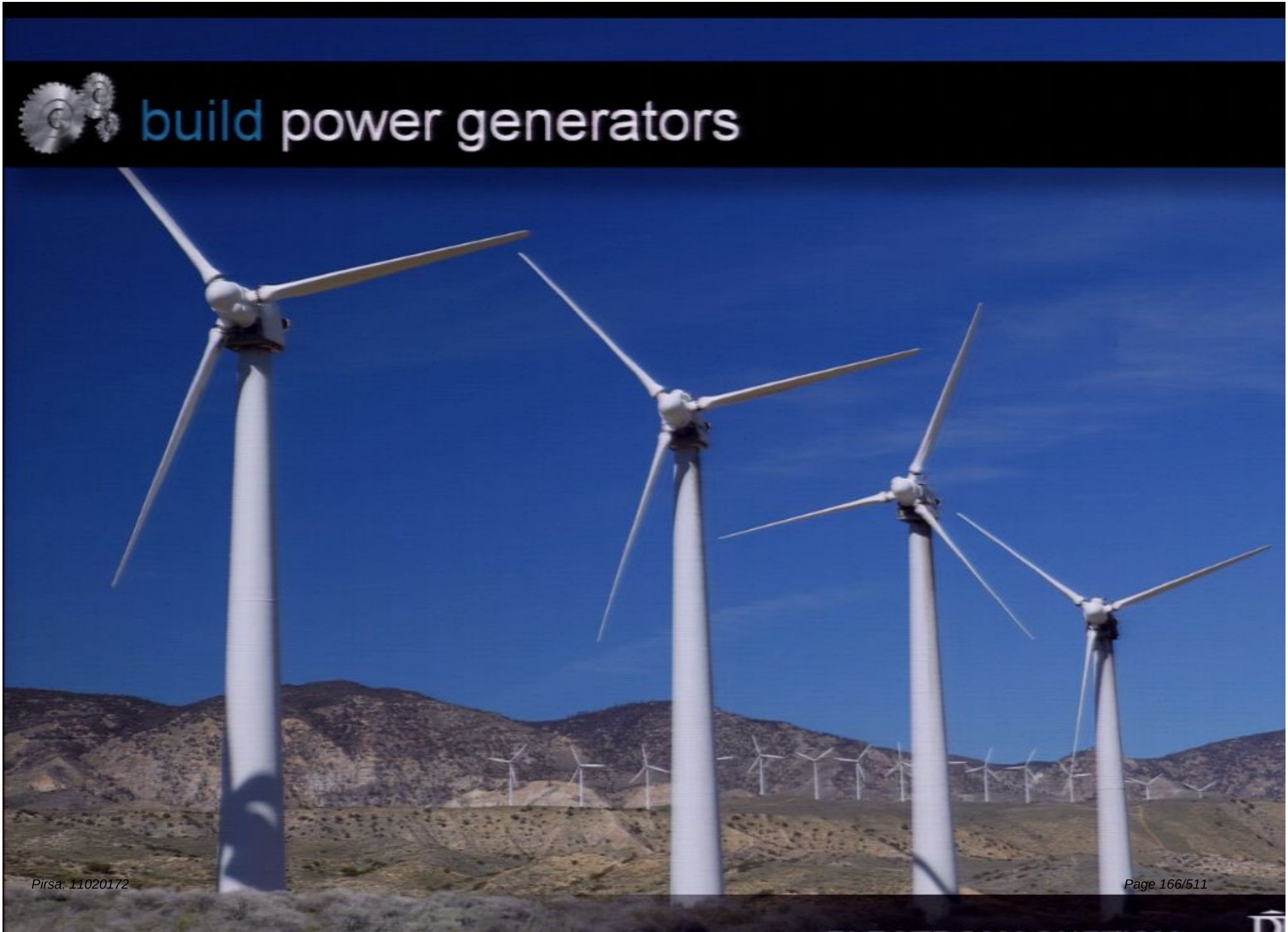
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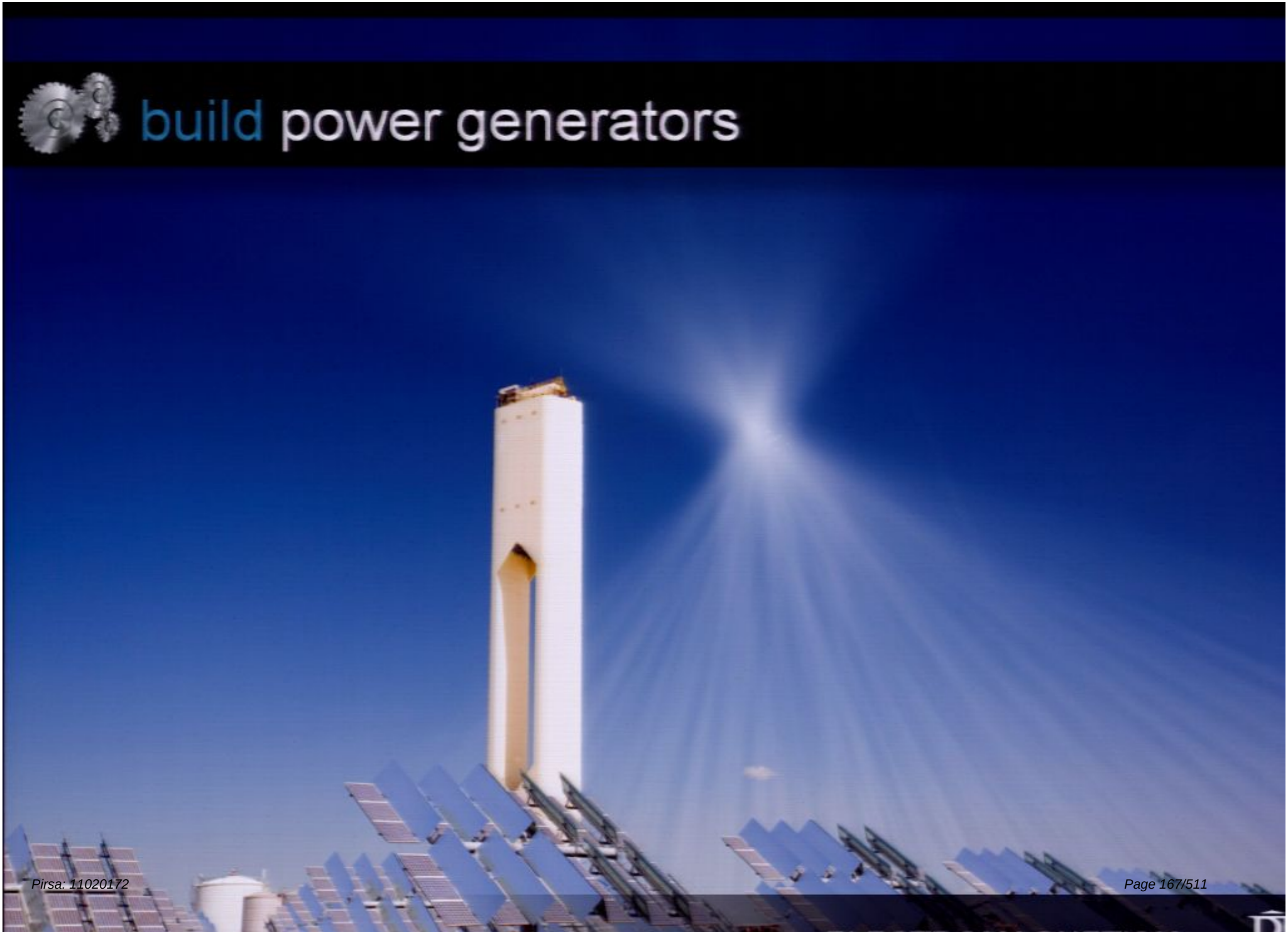
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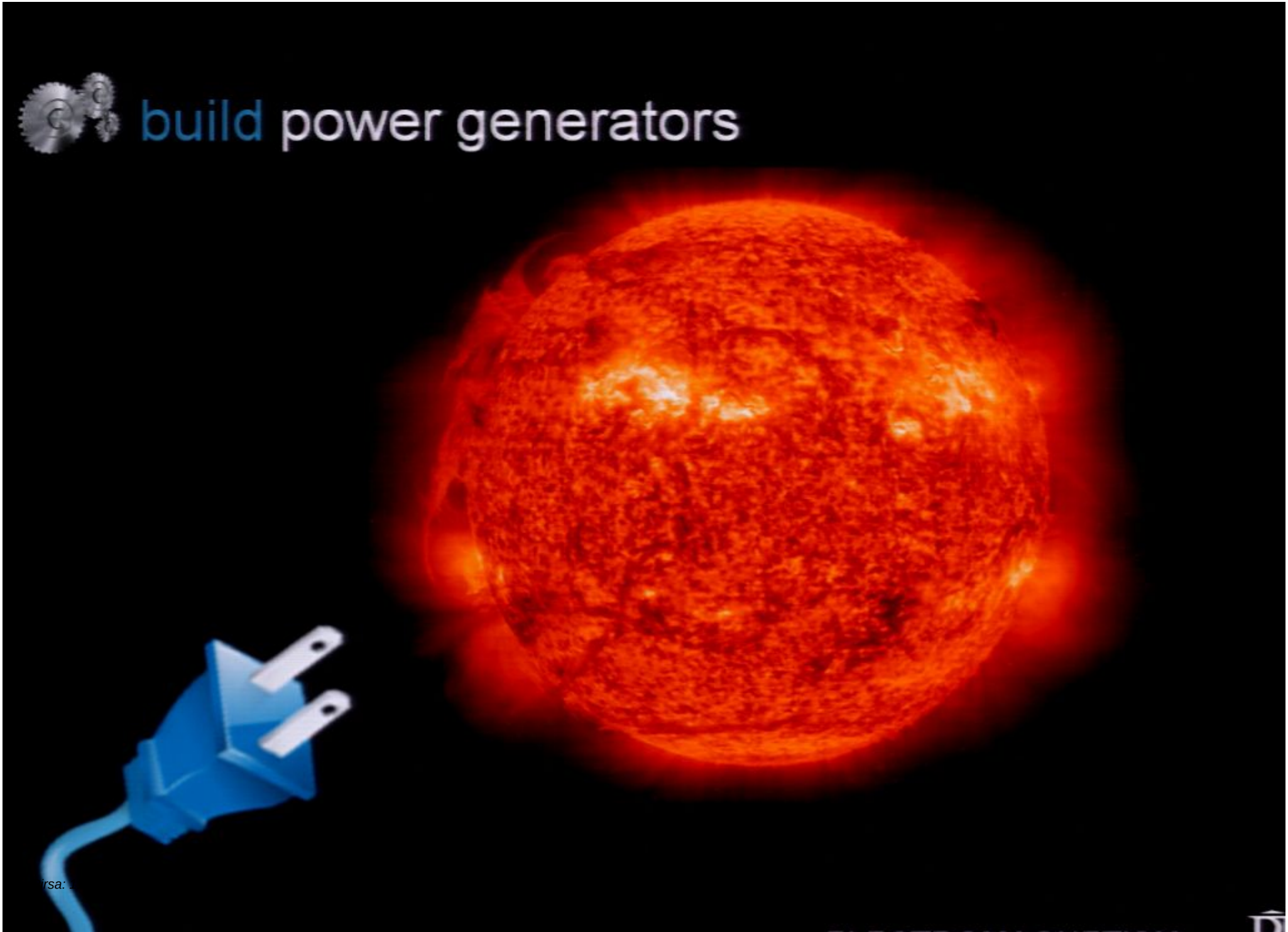
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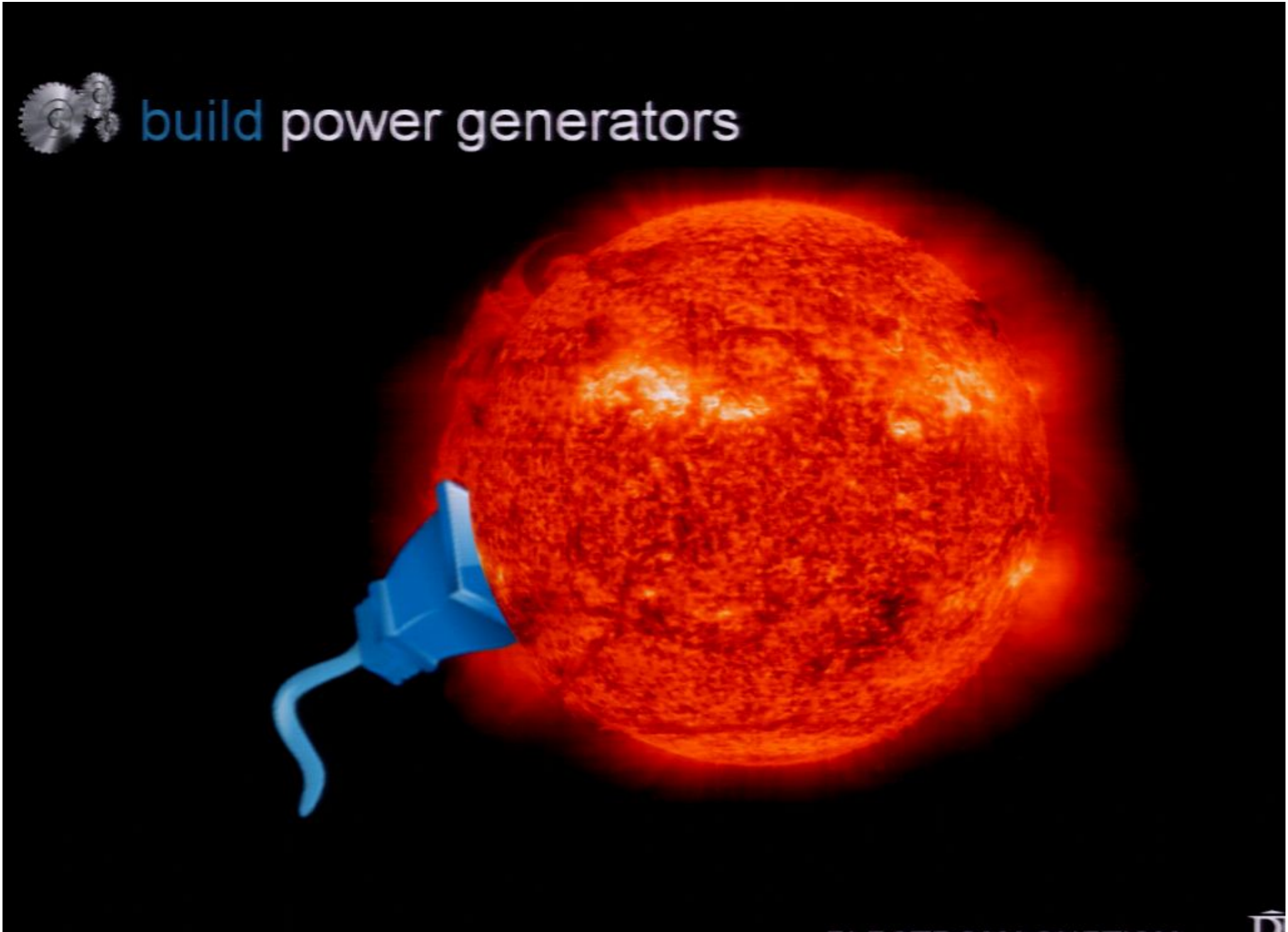
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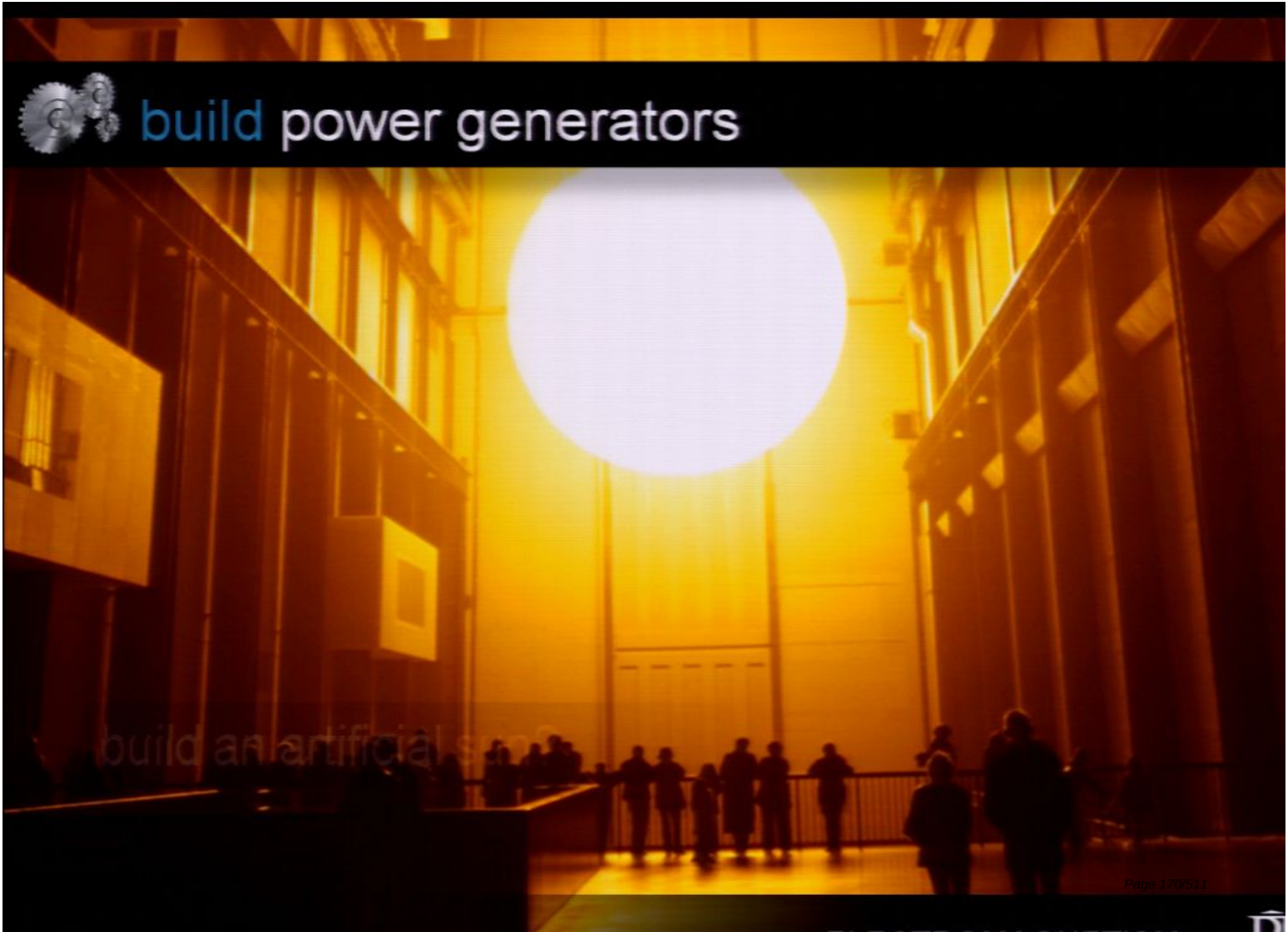
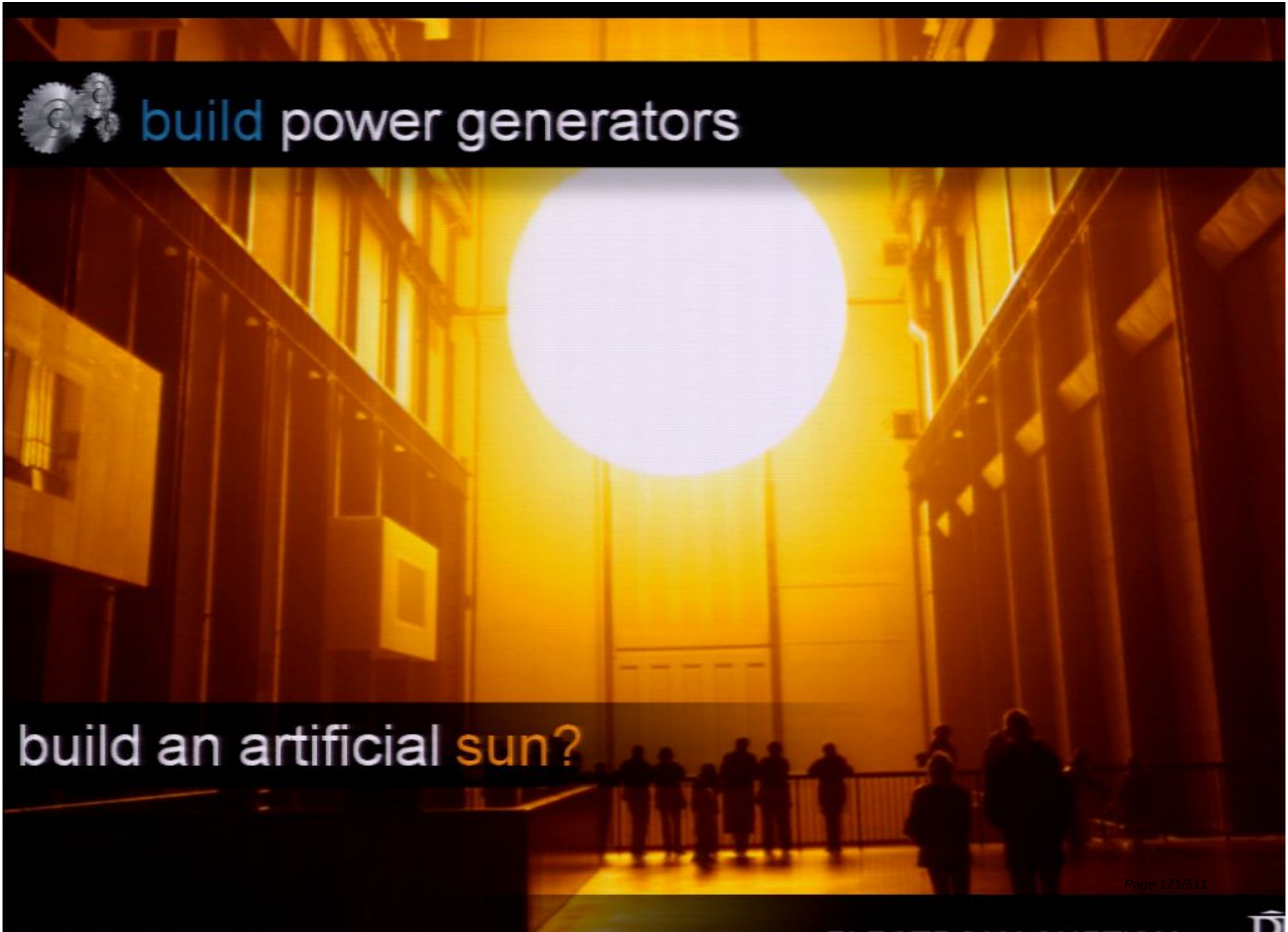
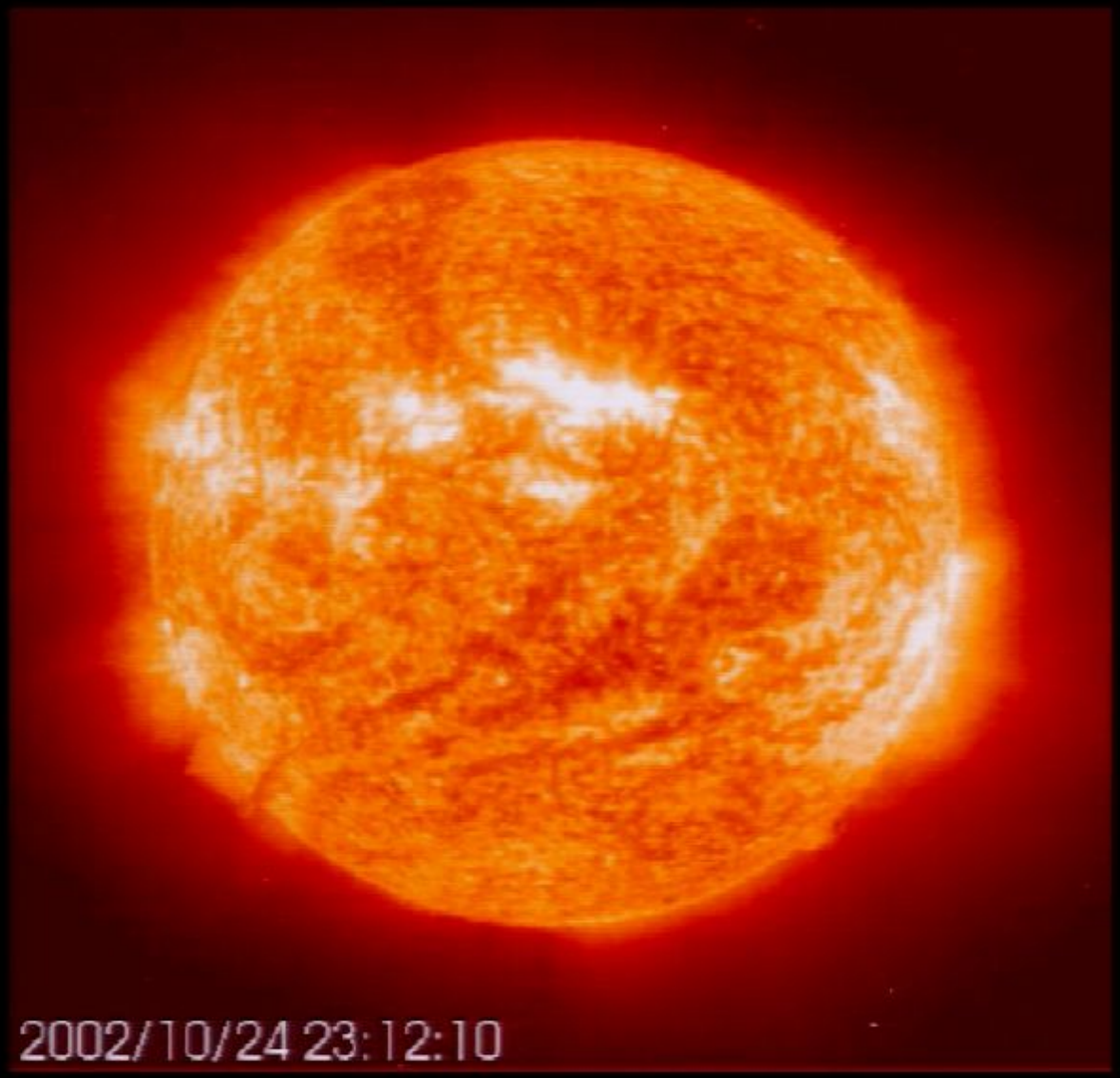

build power generators
build an artificial


build power generators
build an artificial sun?



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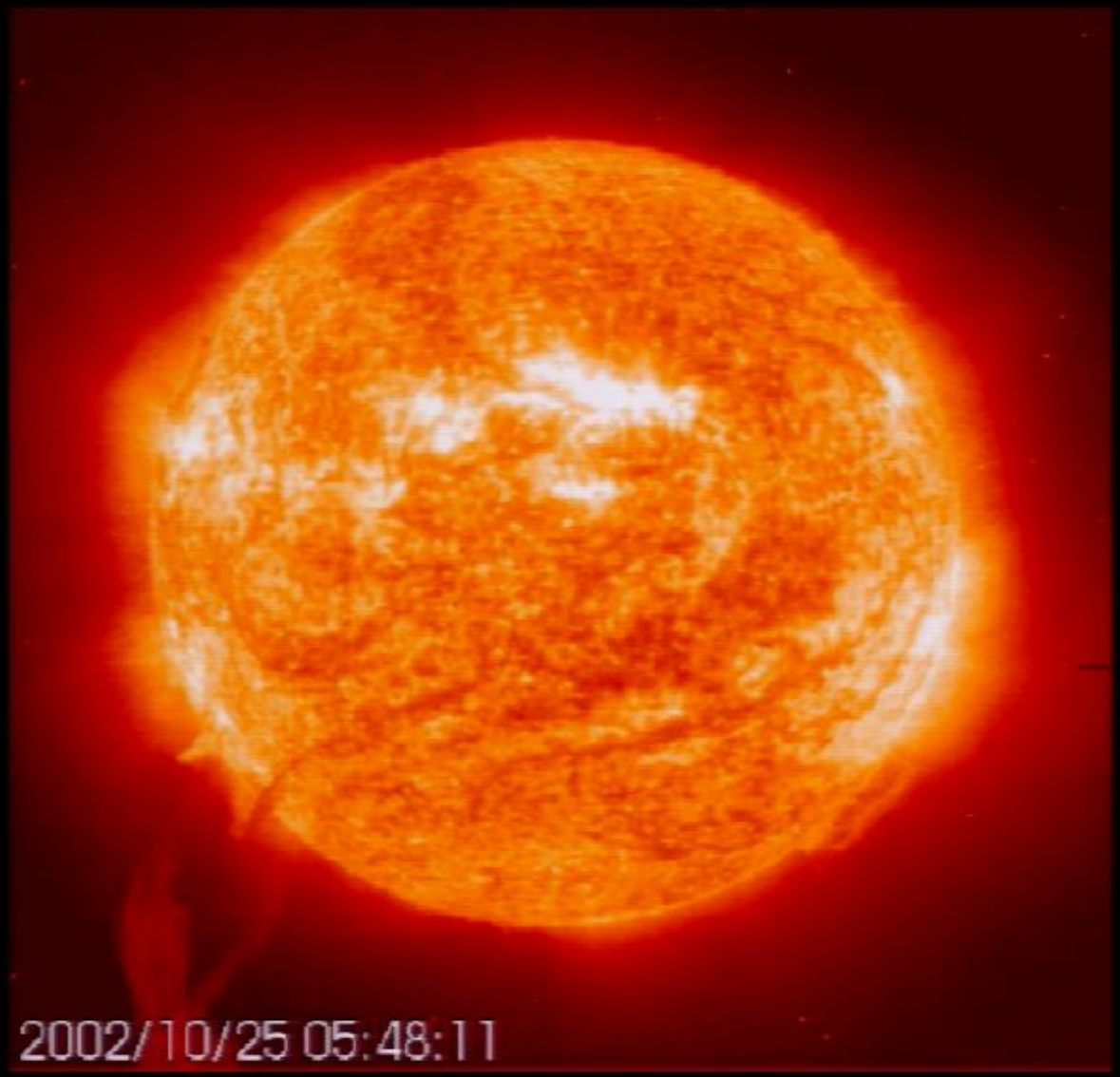

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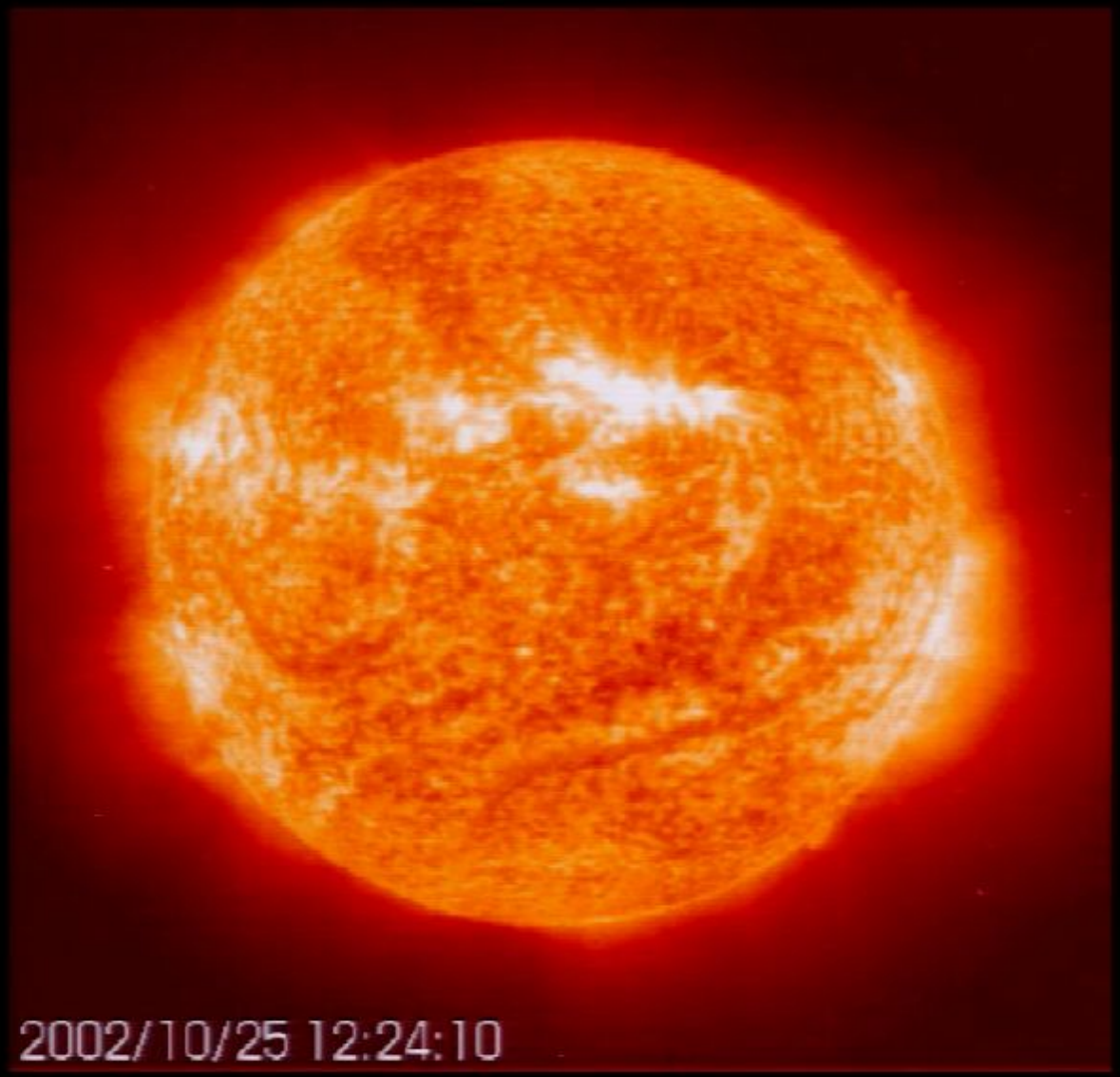

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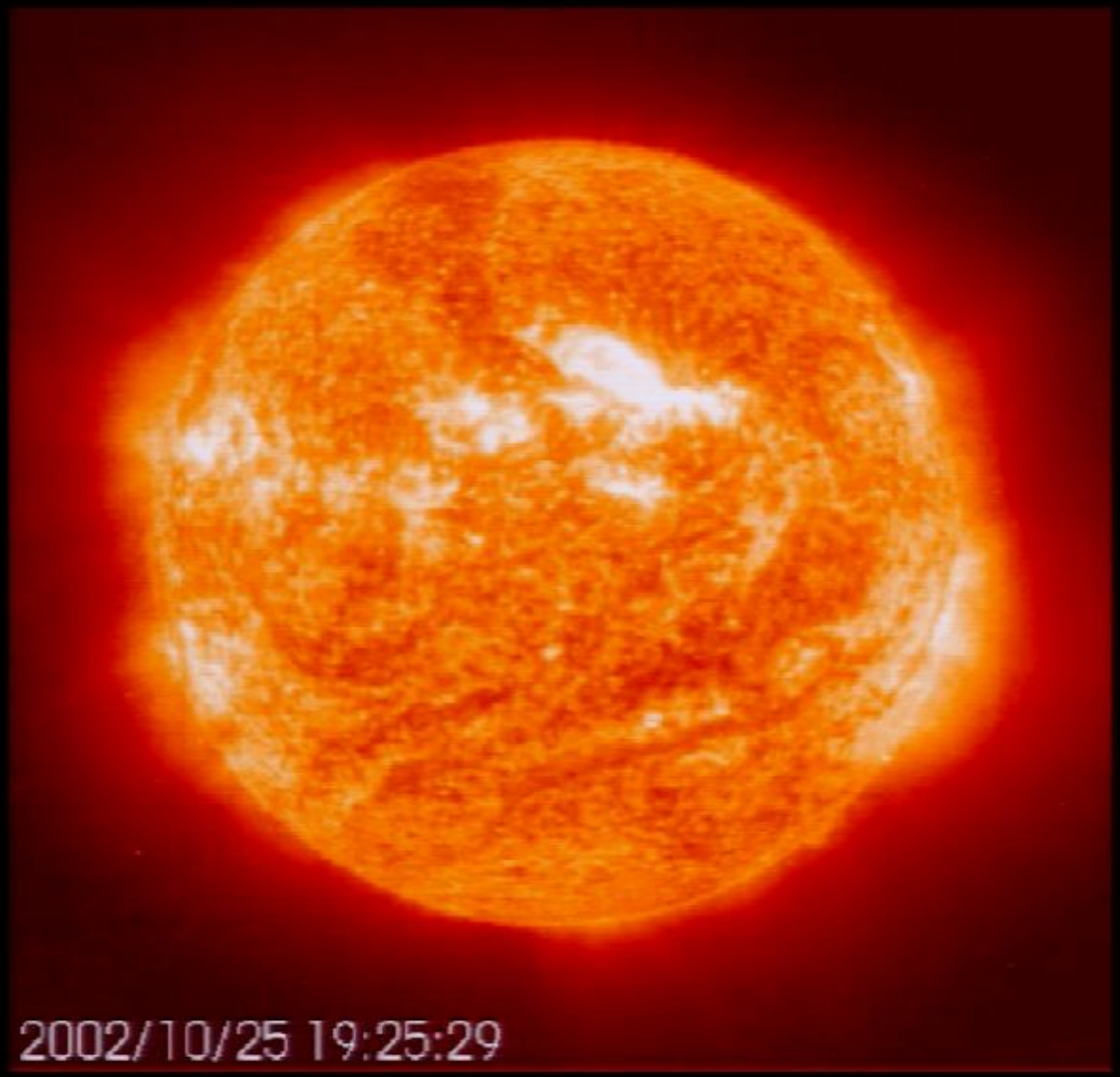

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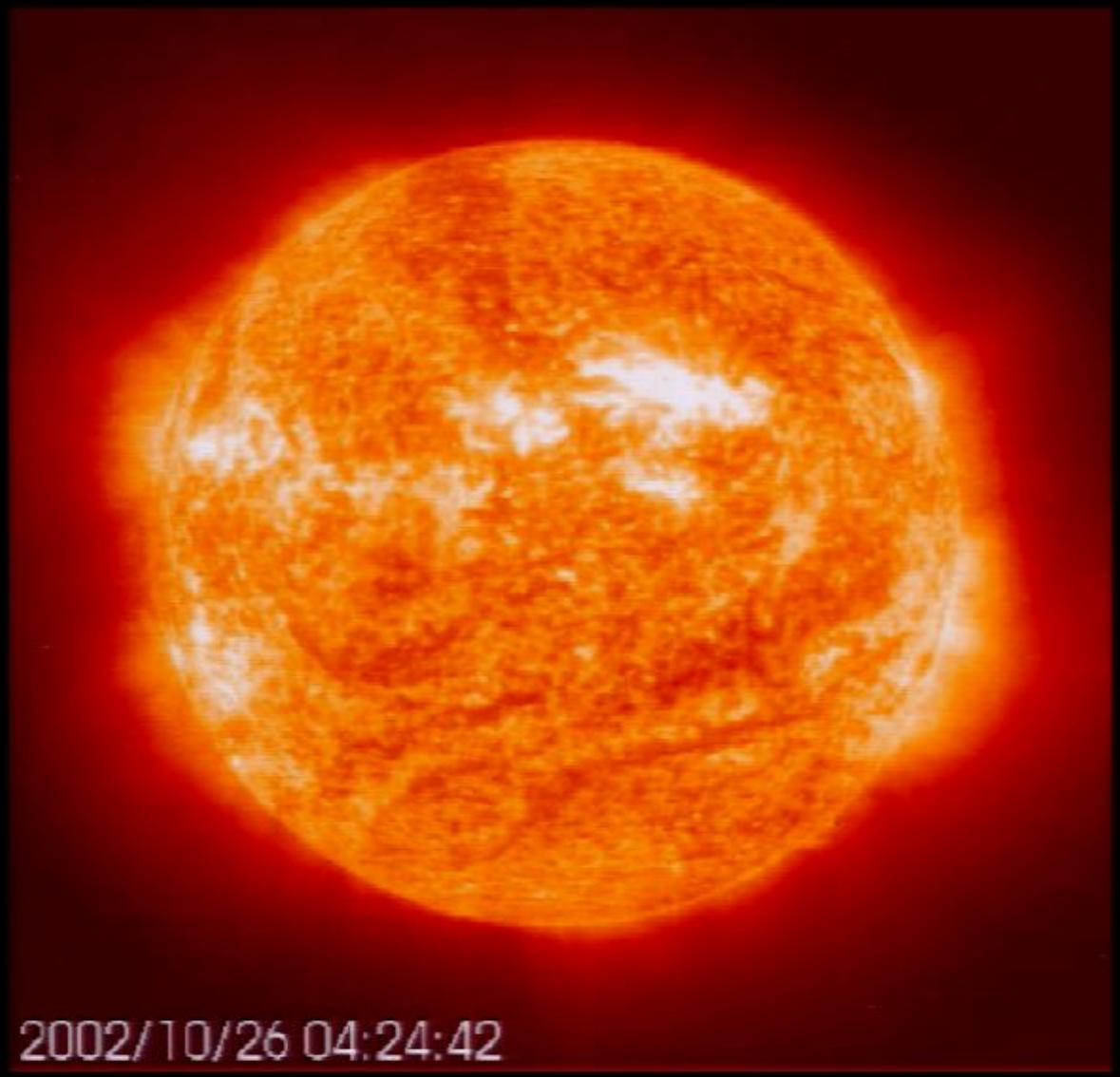

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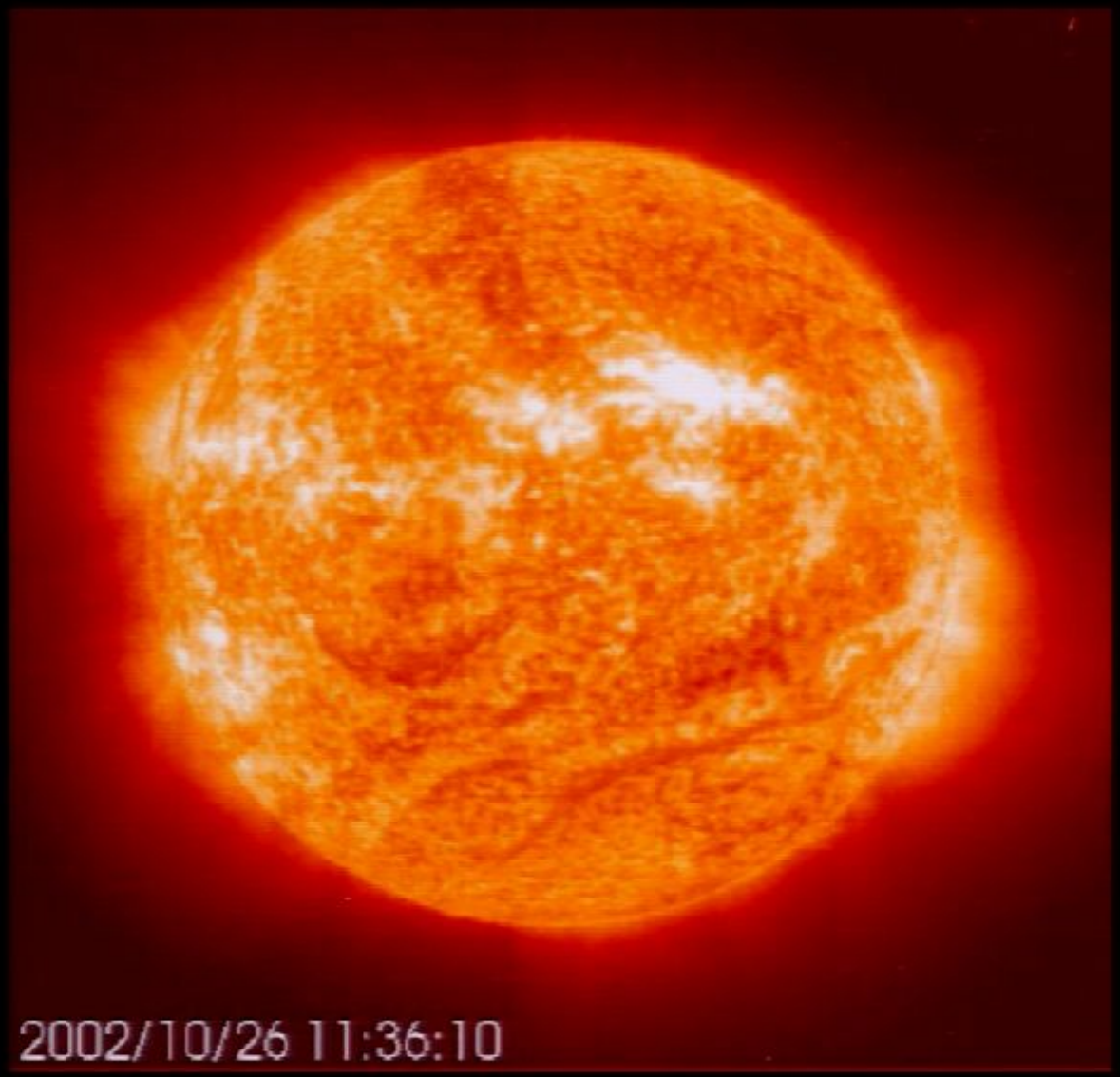

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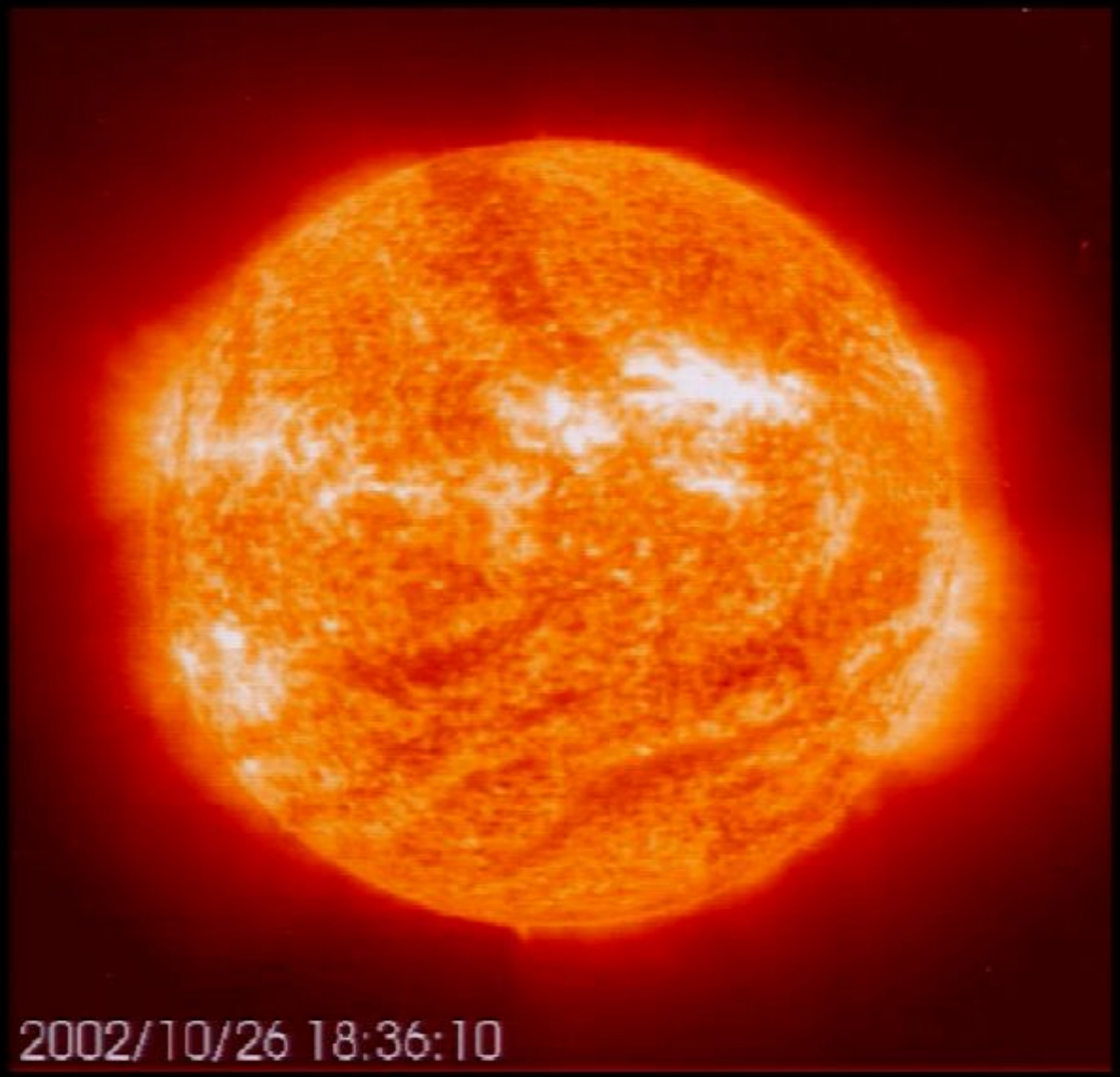

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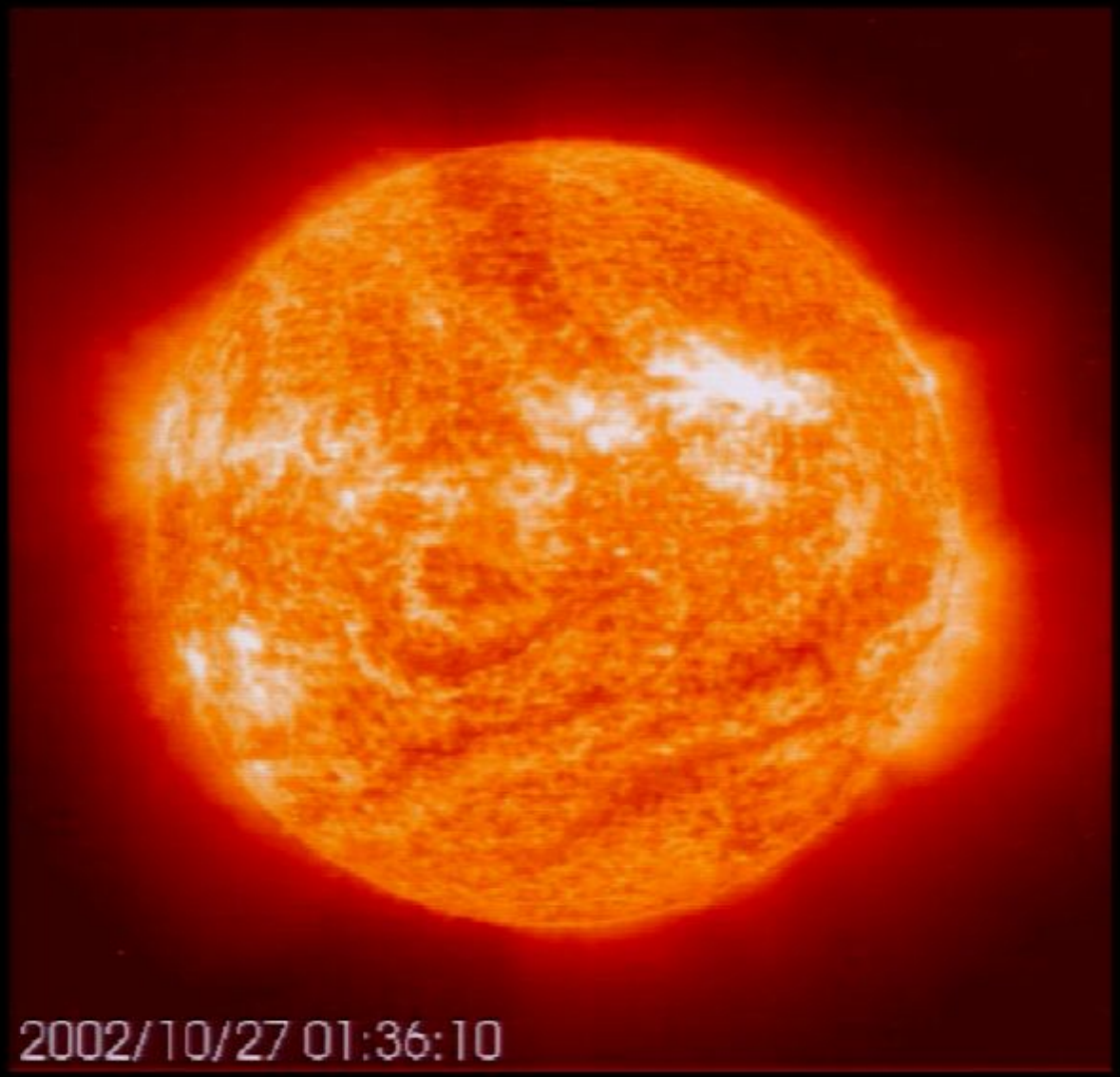

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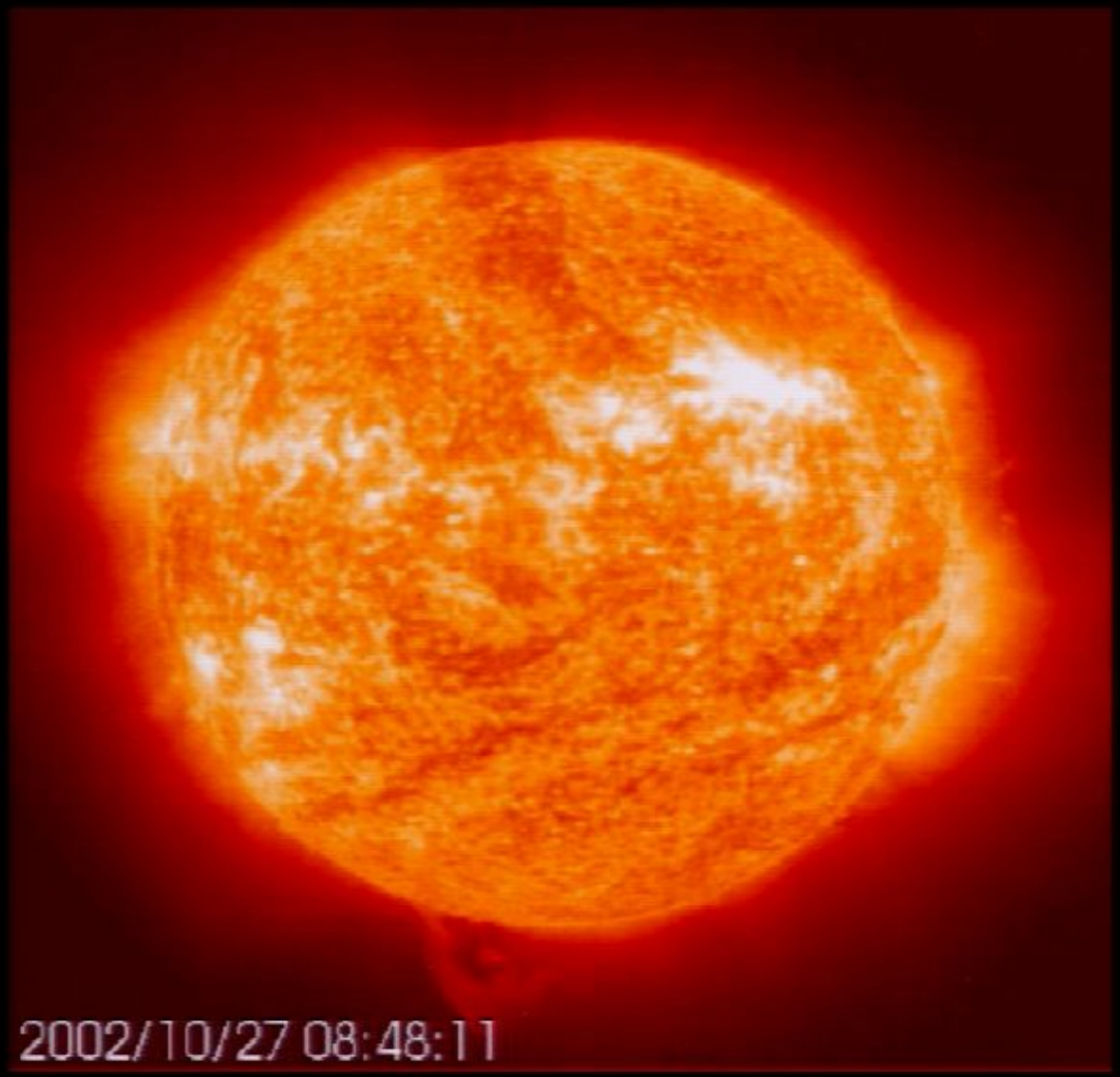

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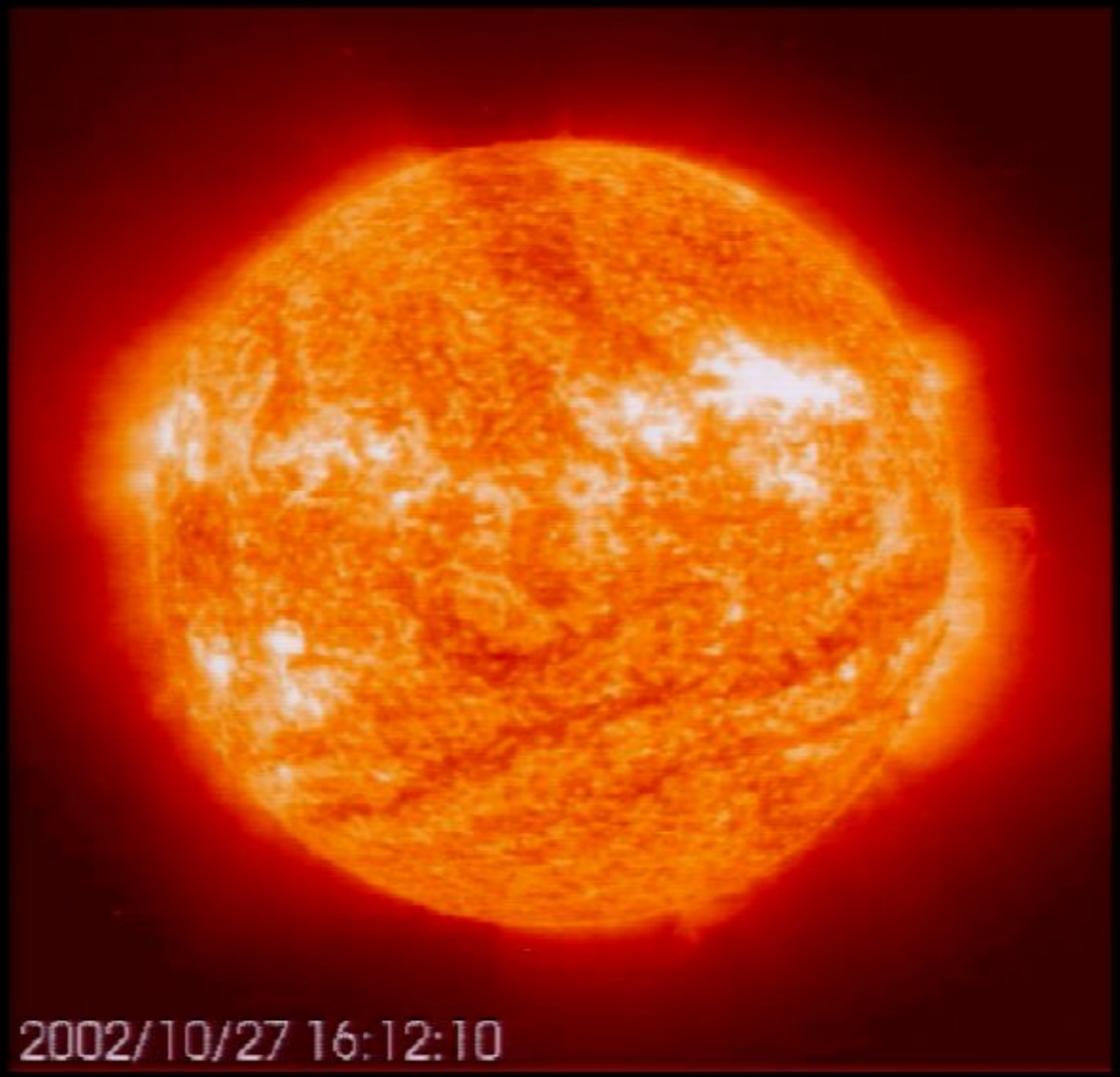

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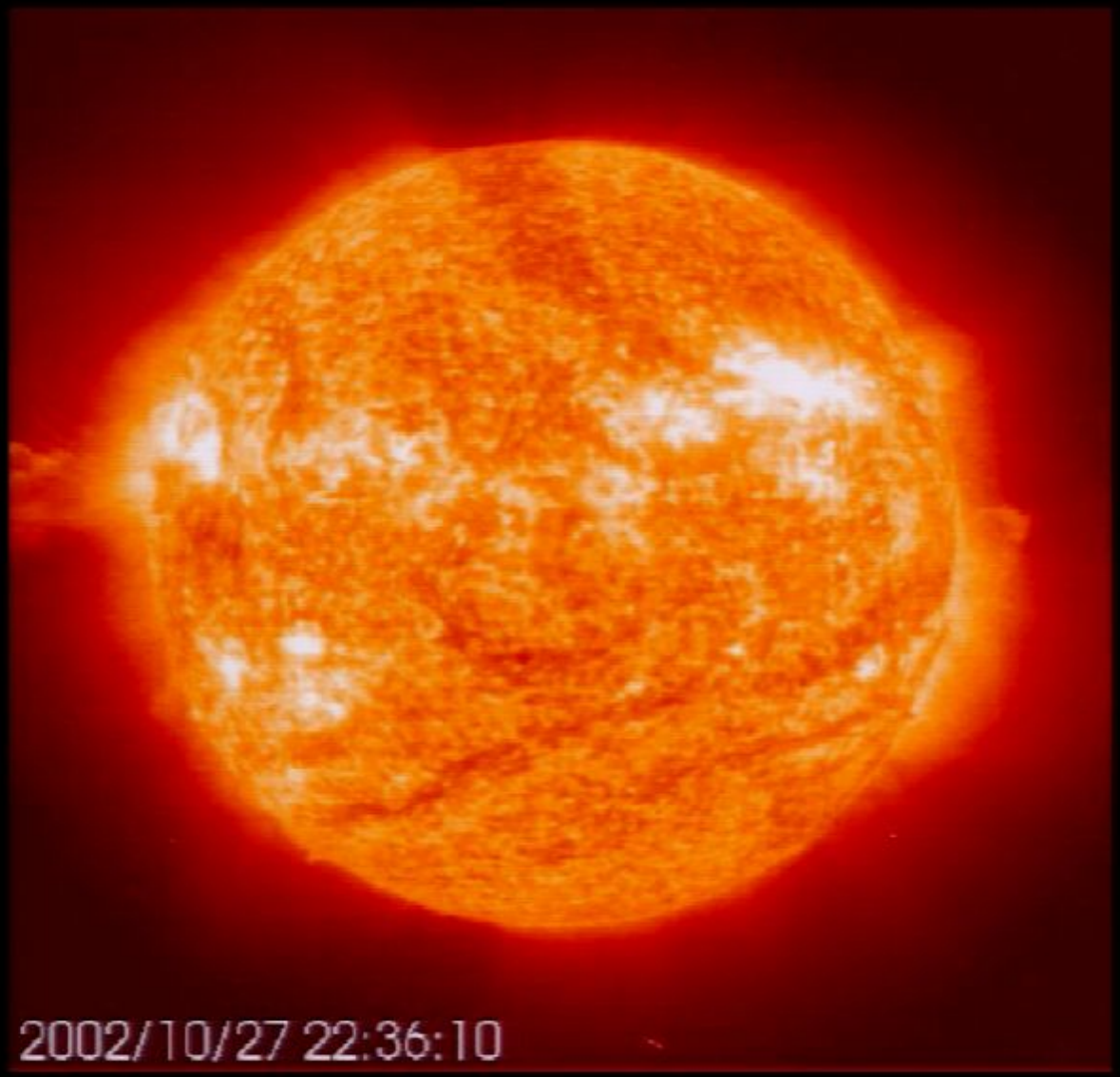

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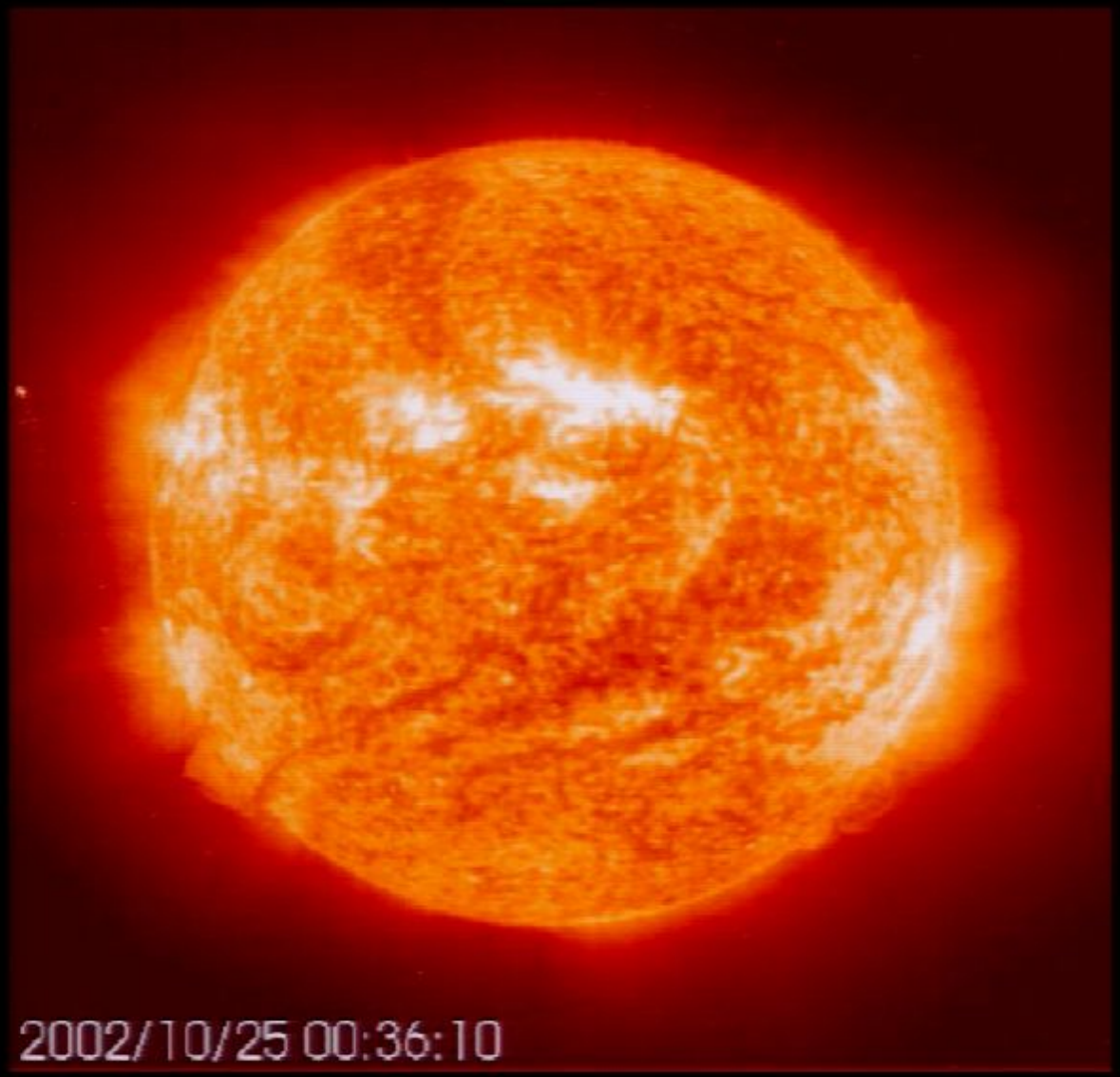

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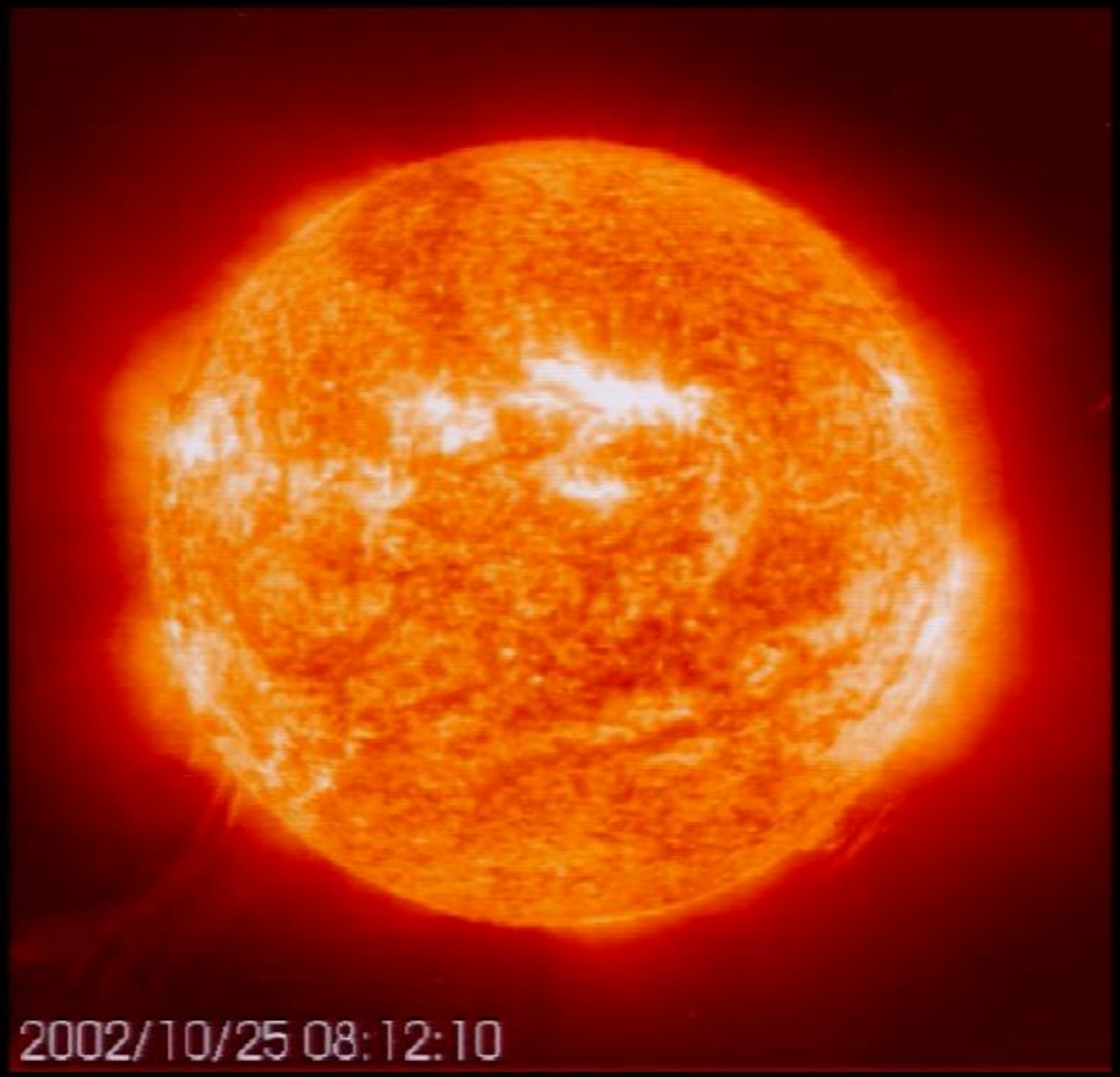

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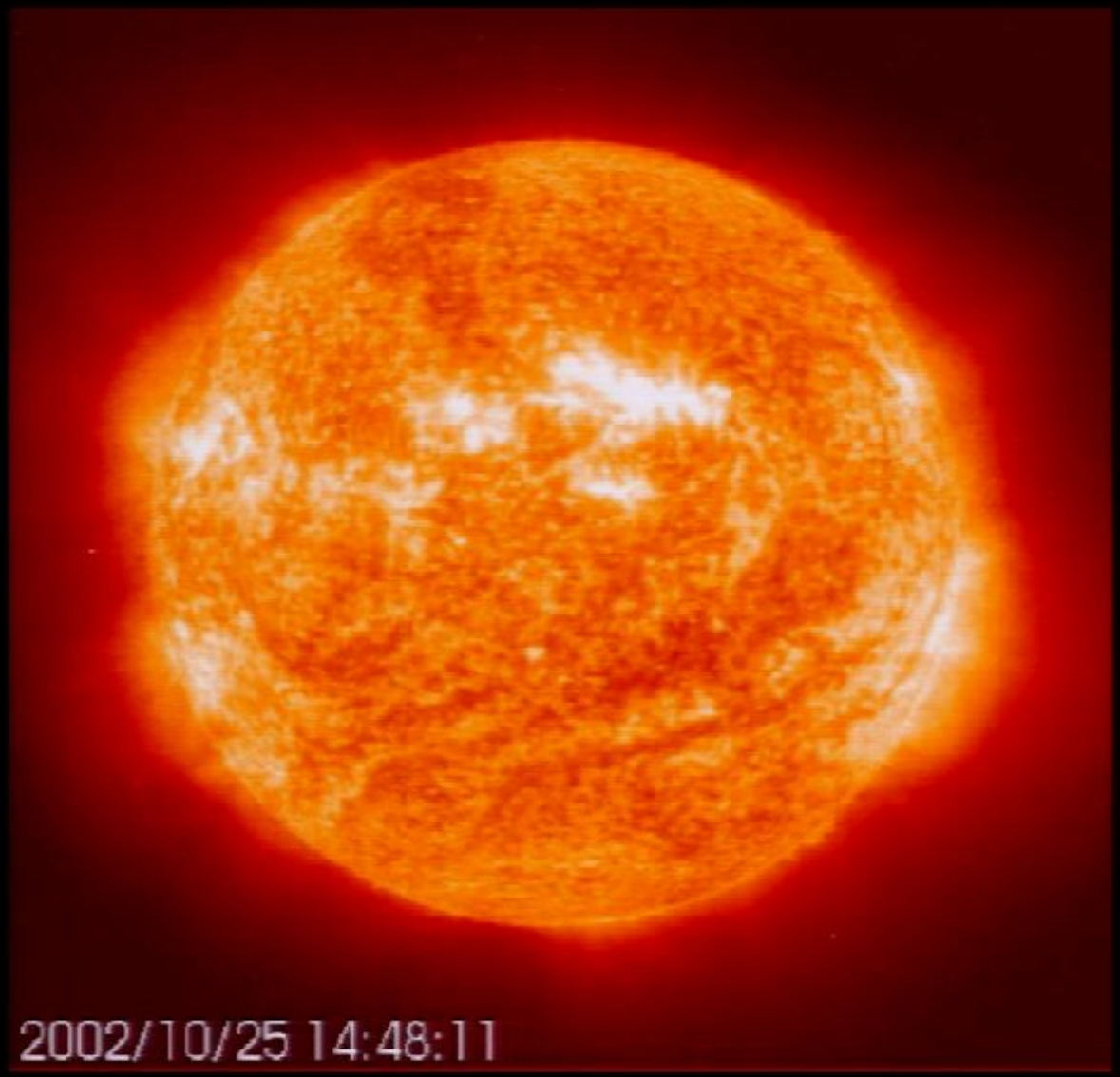

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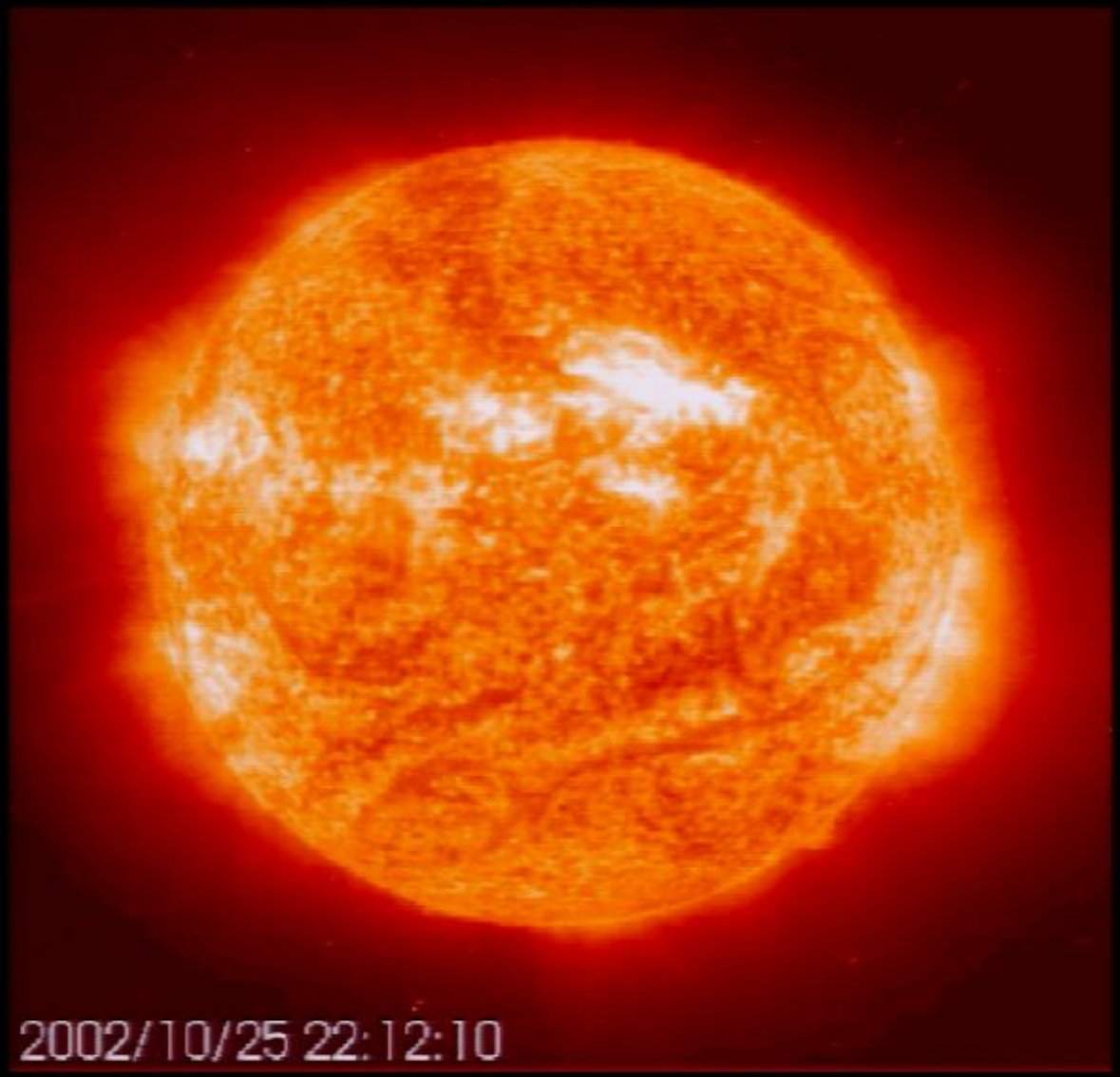

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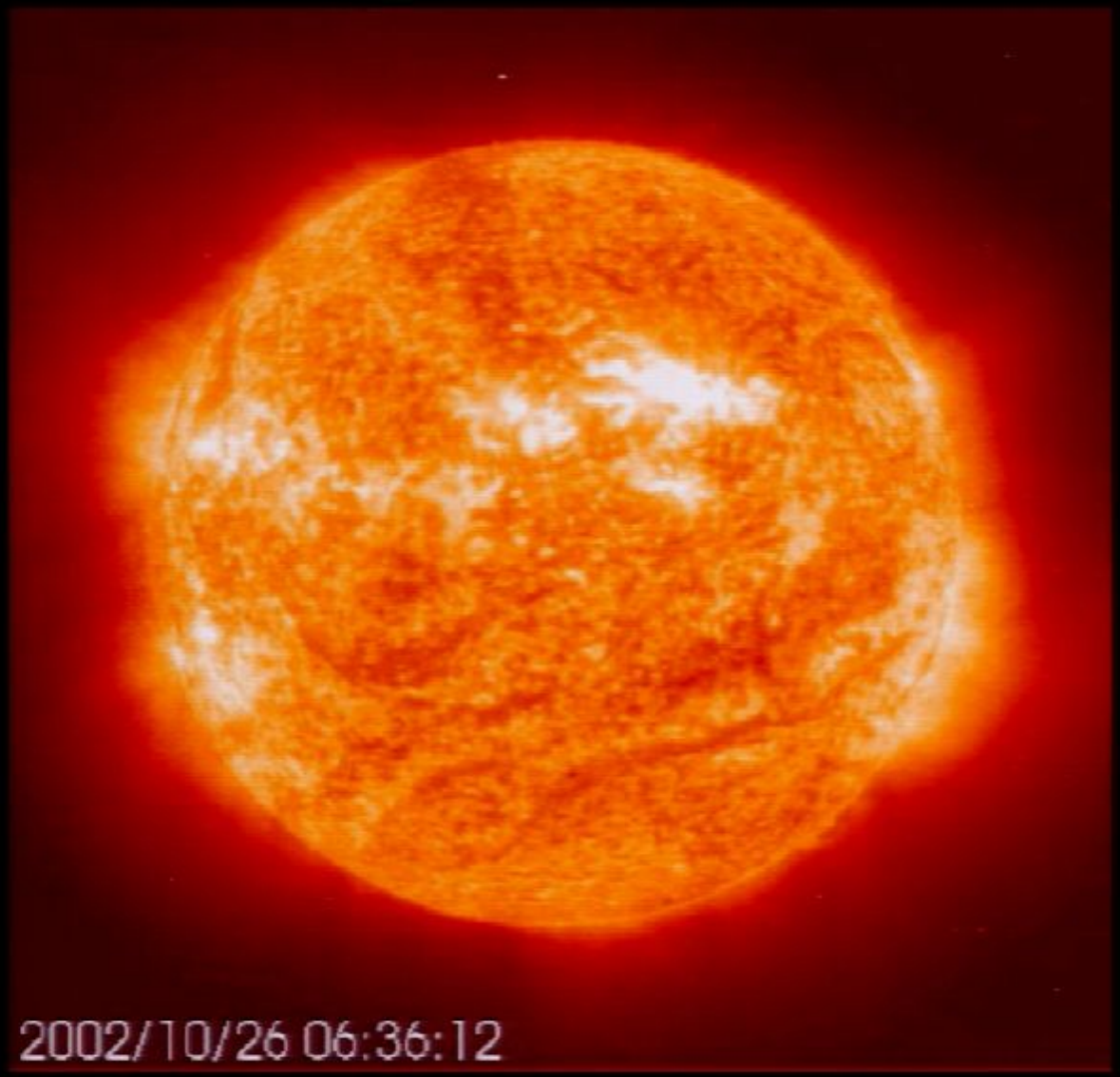

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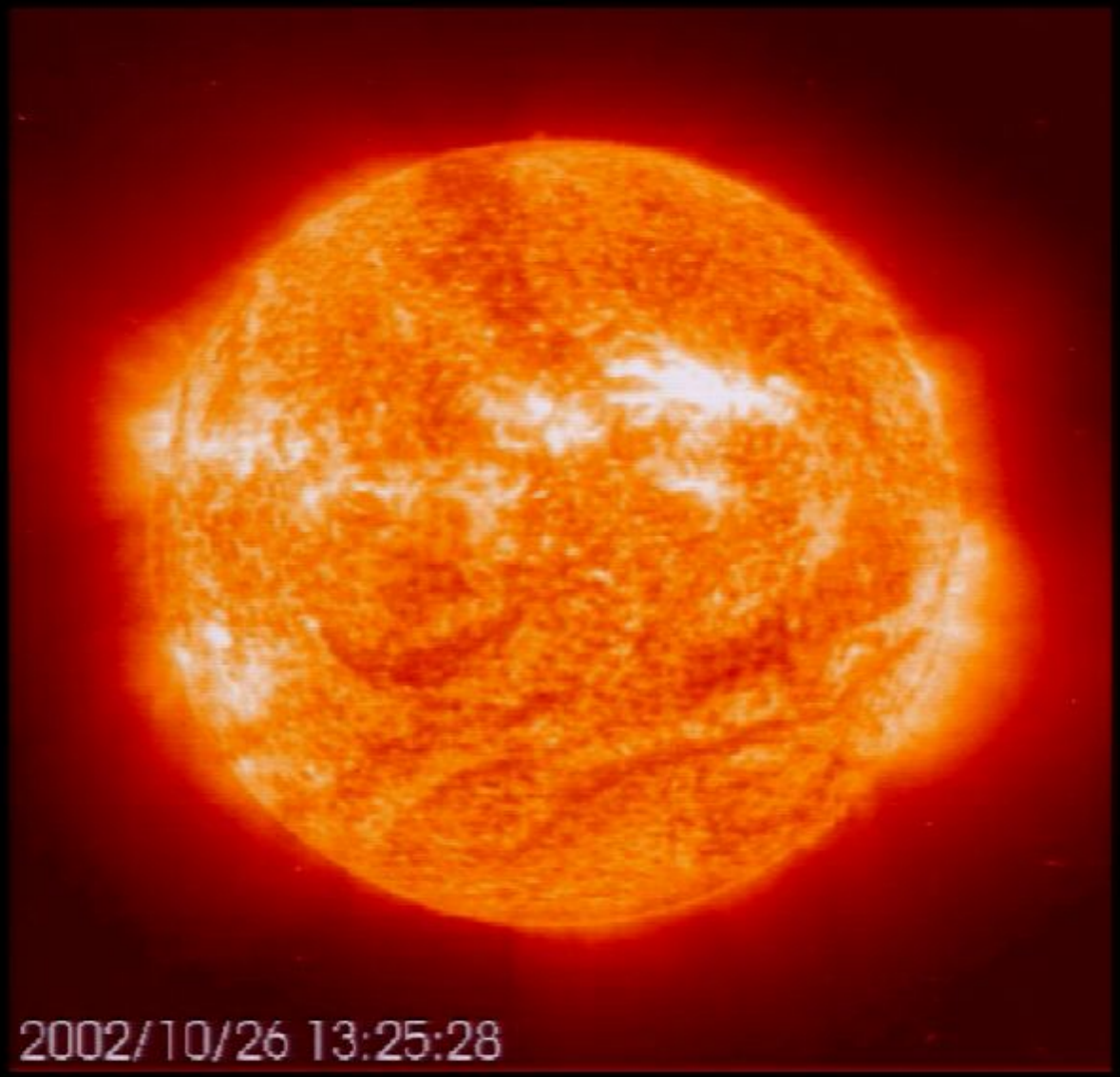
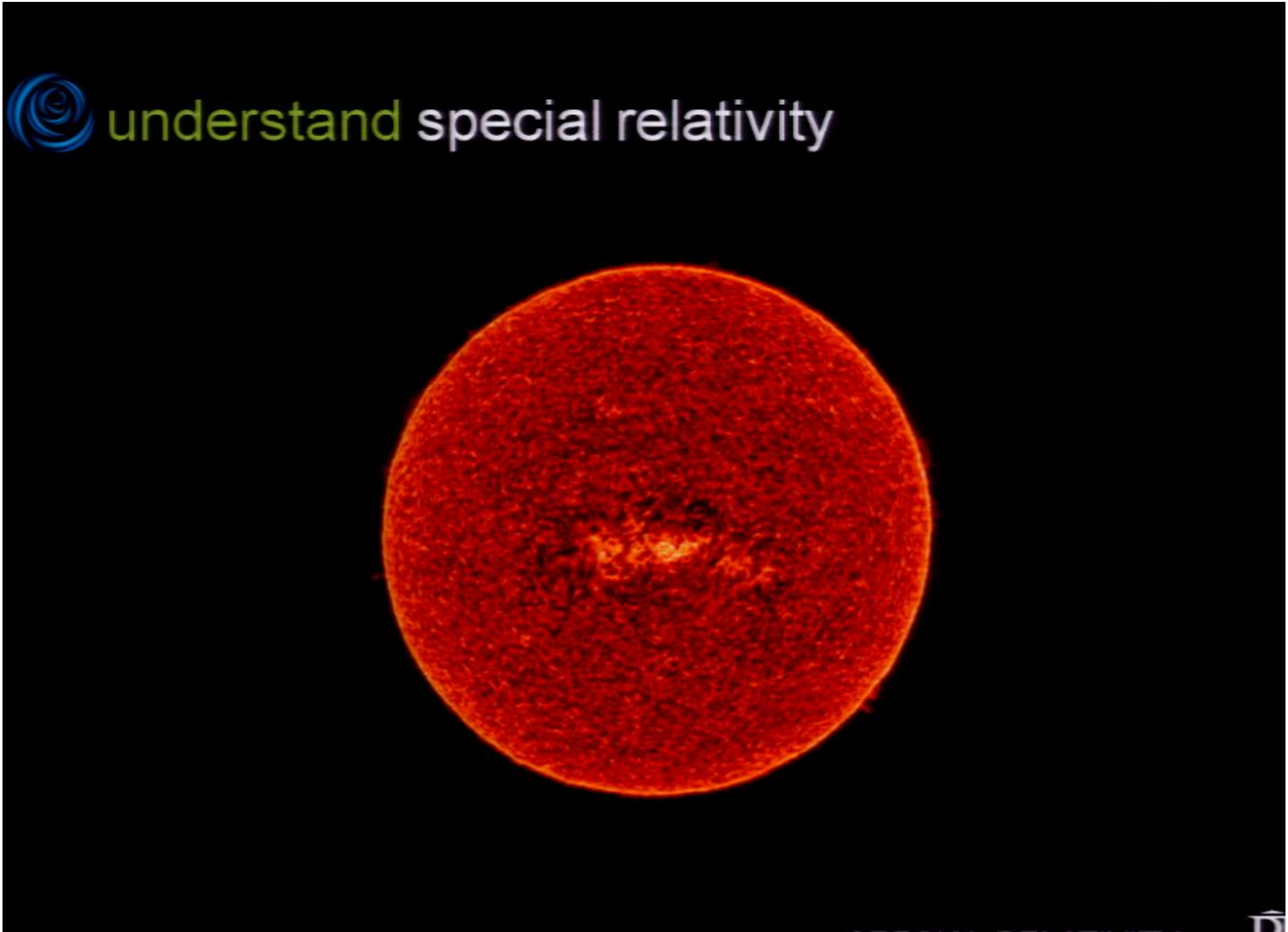
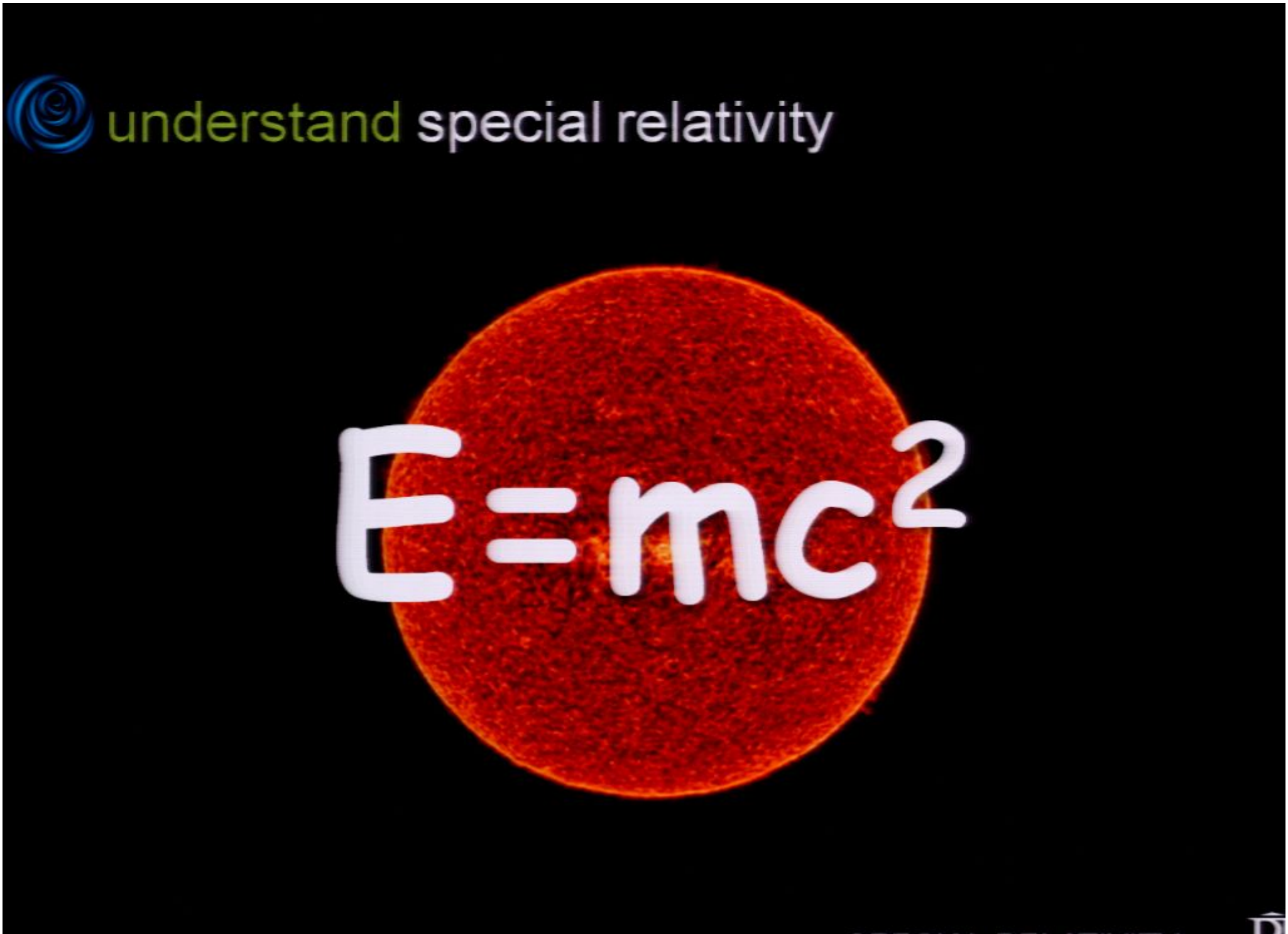


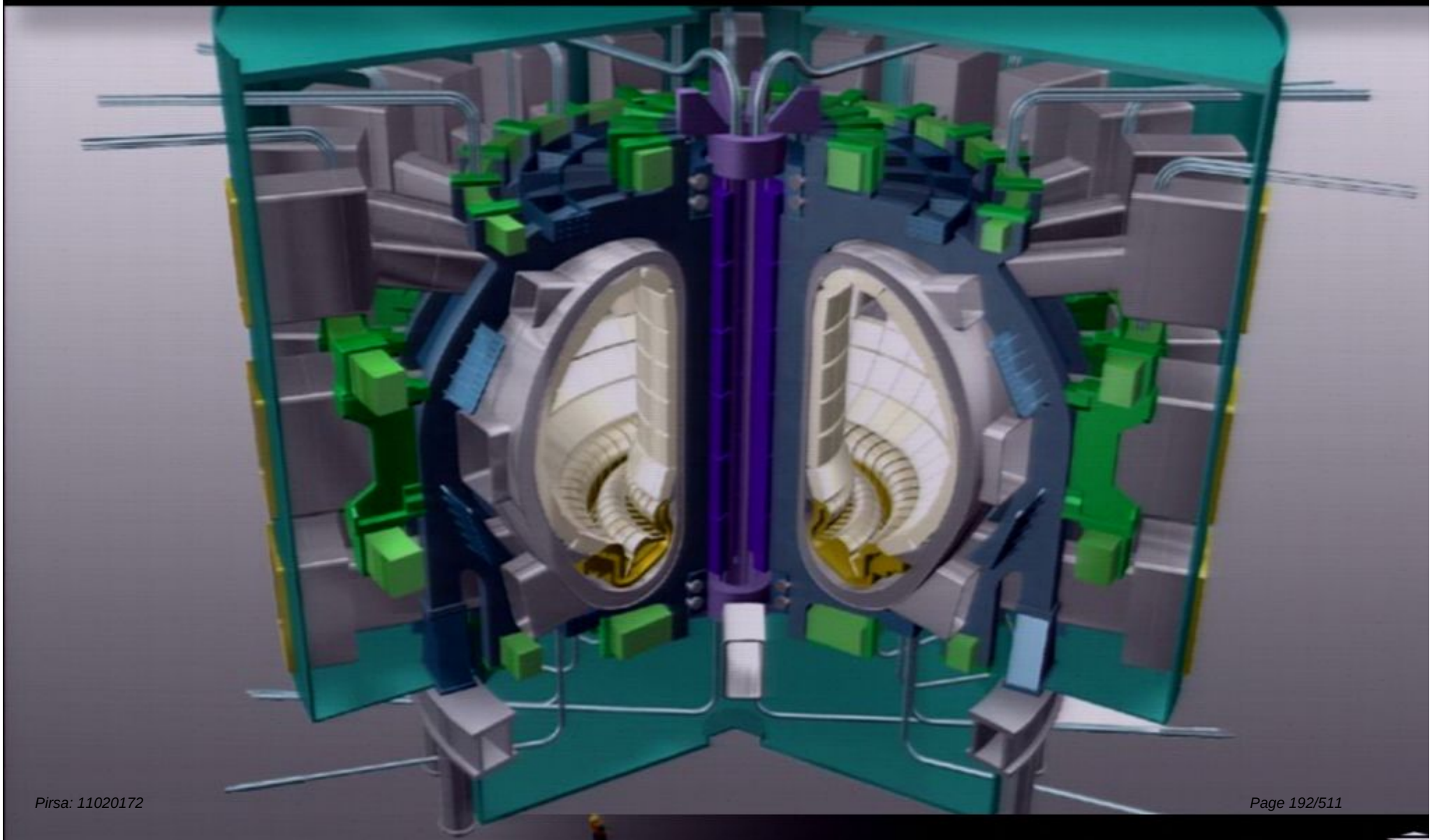
how does this thing work?

THE PHYSICS OF INNOVATION
SPECIAL RELATIVITY


understand special relativity


understand special relativity
E=mc²

build artificial sun (ITER)

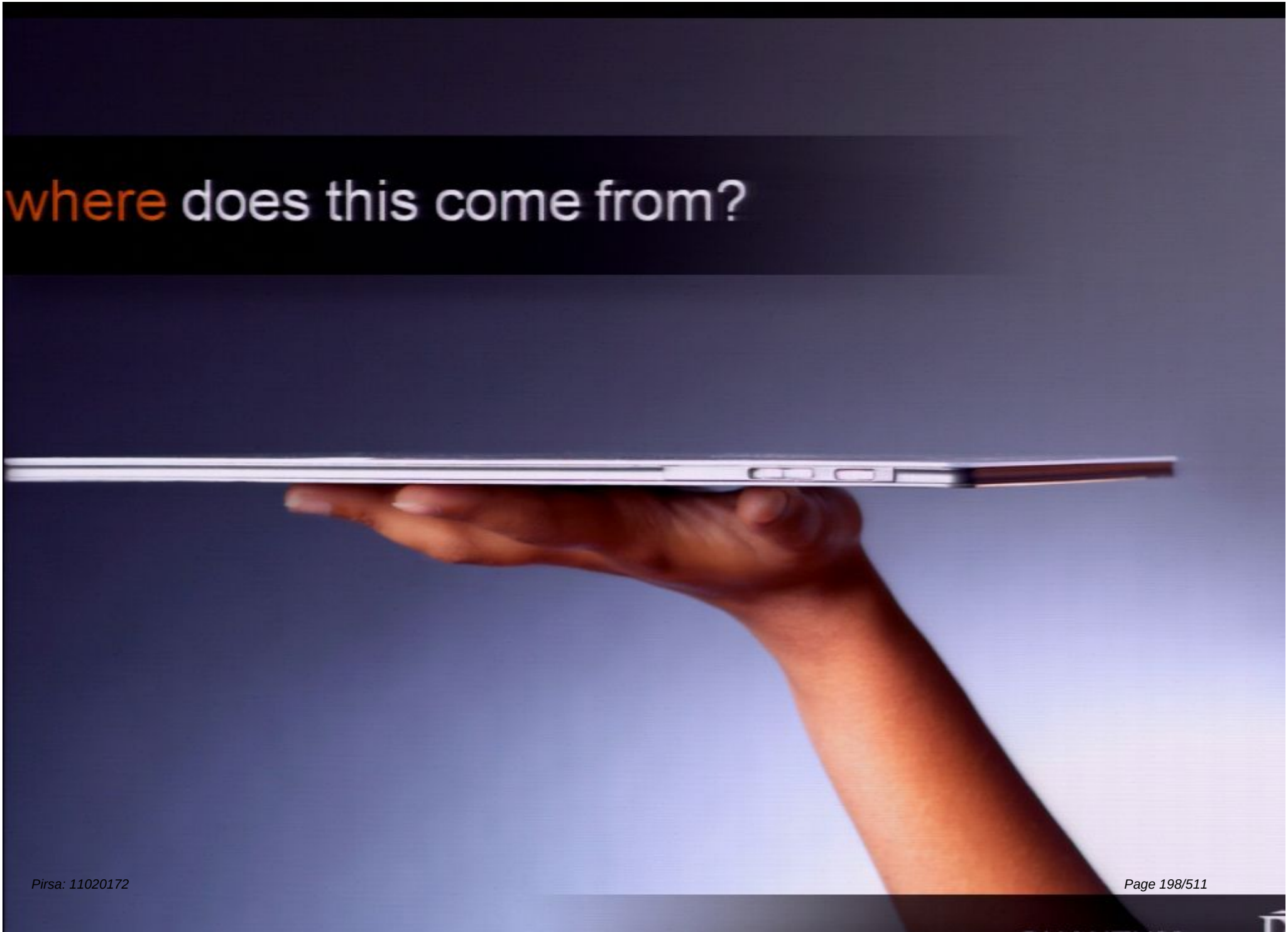


THE PHYSICS OF INNOVATION
GENERAL RELATIVITY

Lyon
Back
A6
3ème Arrondissement Lyon
2ème
7ème Arrondissement Lyon
Foy-lès-Lyon
9ème Arrondi
21:14
Navigate
Det.
Sim.
MAP
MENU

where does
this come
from?
Lyon
Back
A6
3ème Arrondissement Lyon
2ème
7ème Arrondissement Lyon
Foy-lès-Lyon
9ème Arrondi
21:14
Navigate
Det.
Sim.
MAP
MENU

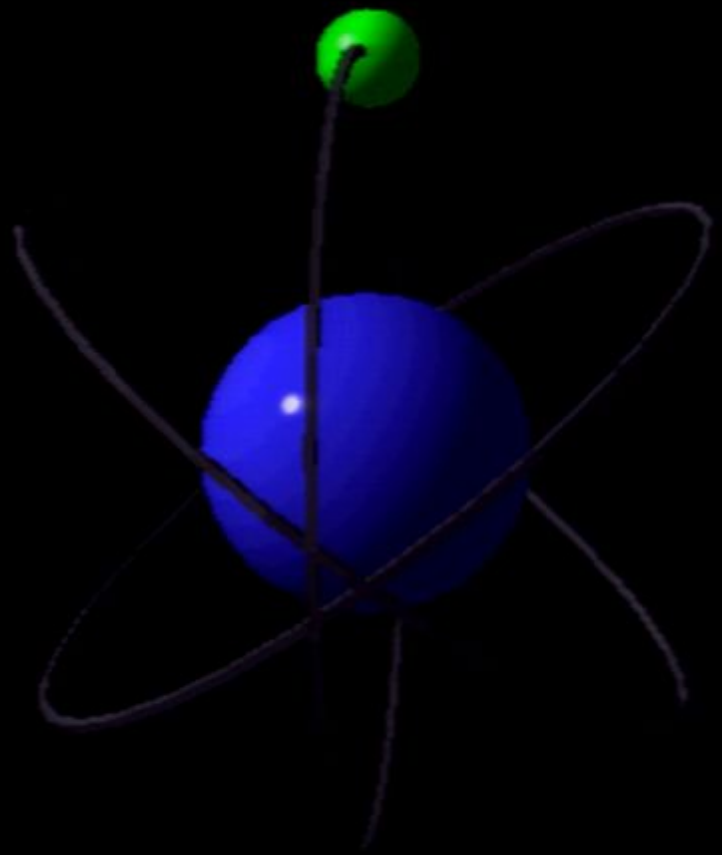
THE PHYSICS OF INNOVATION QUANTUM


where does this come from?

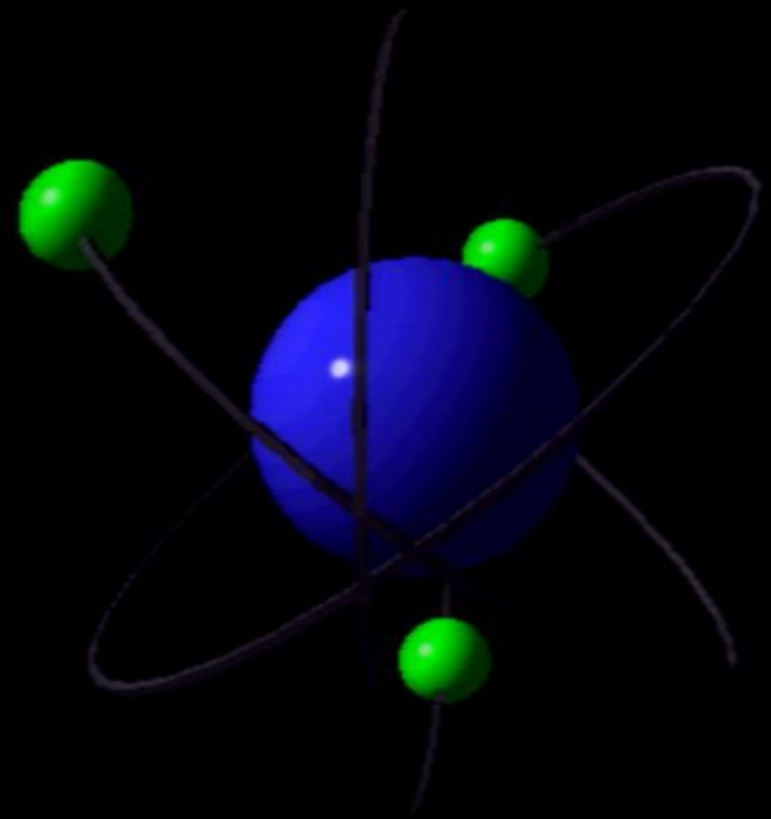
explore mystery

how can atoms exist?

explore how can atoms exist?



explore how can atoms exist?



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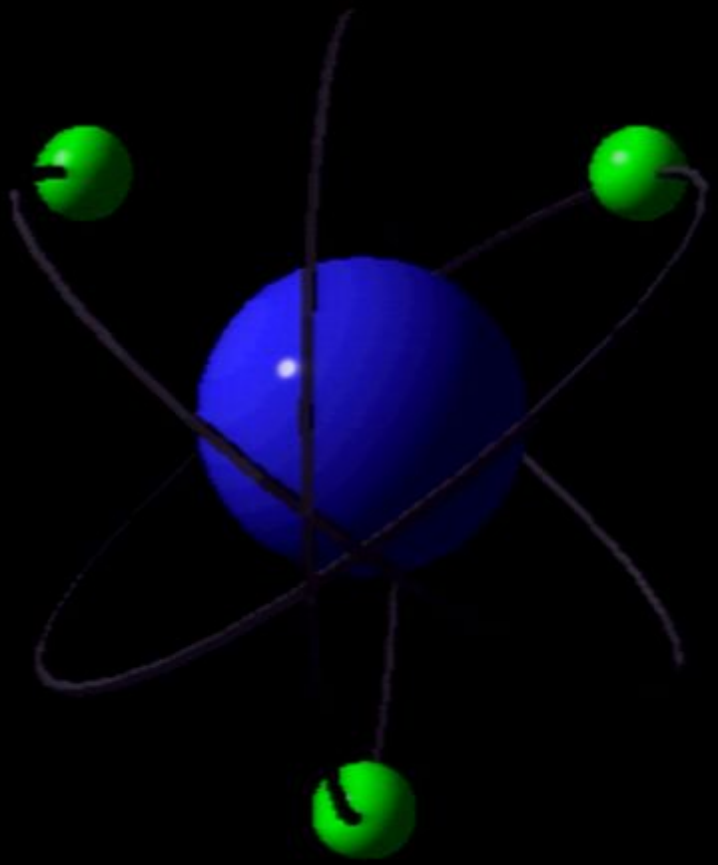

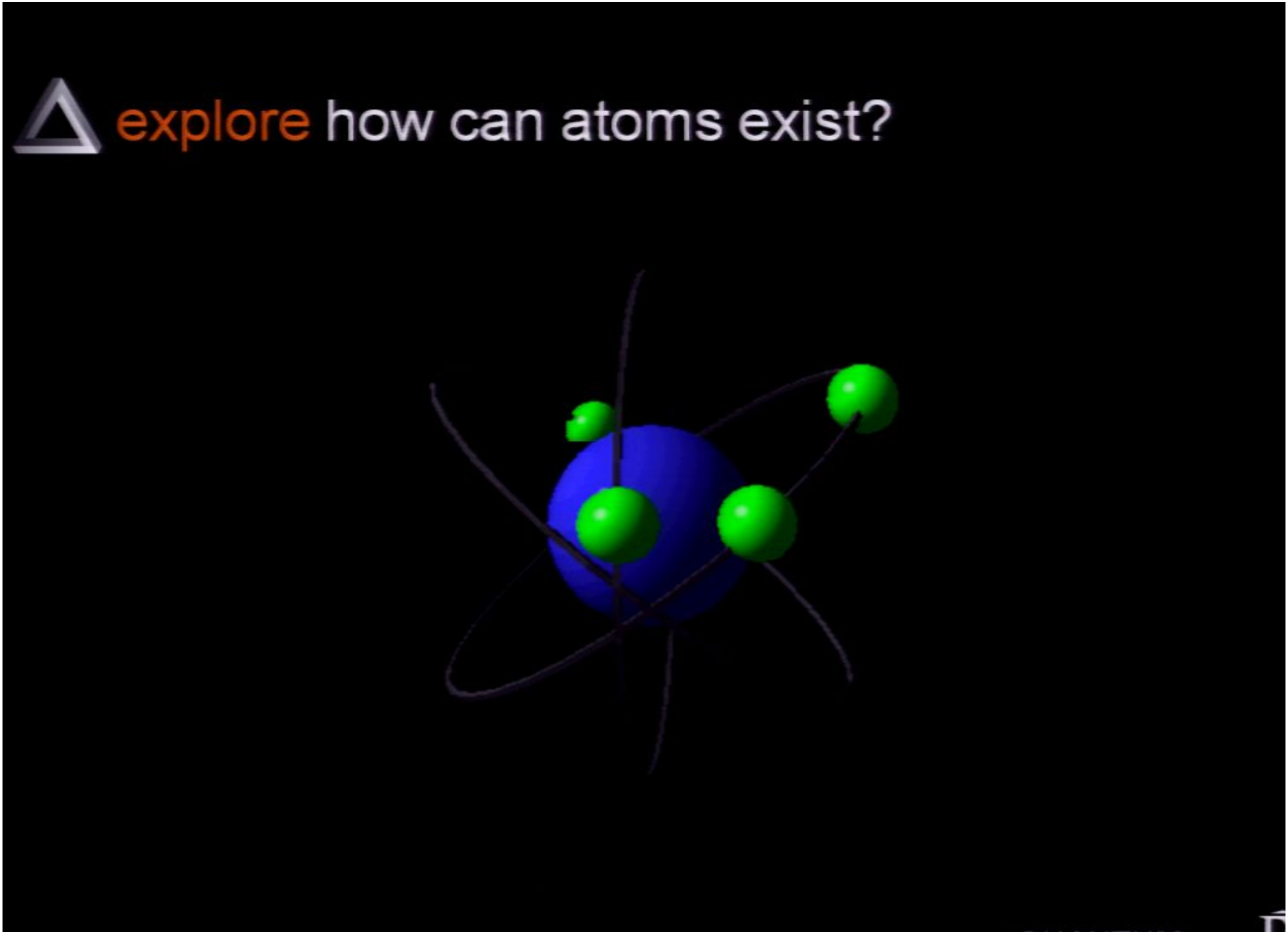
explore how can atoms exist?

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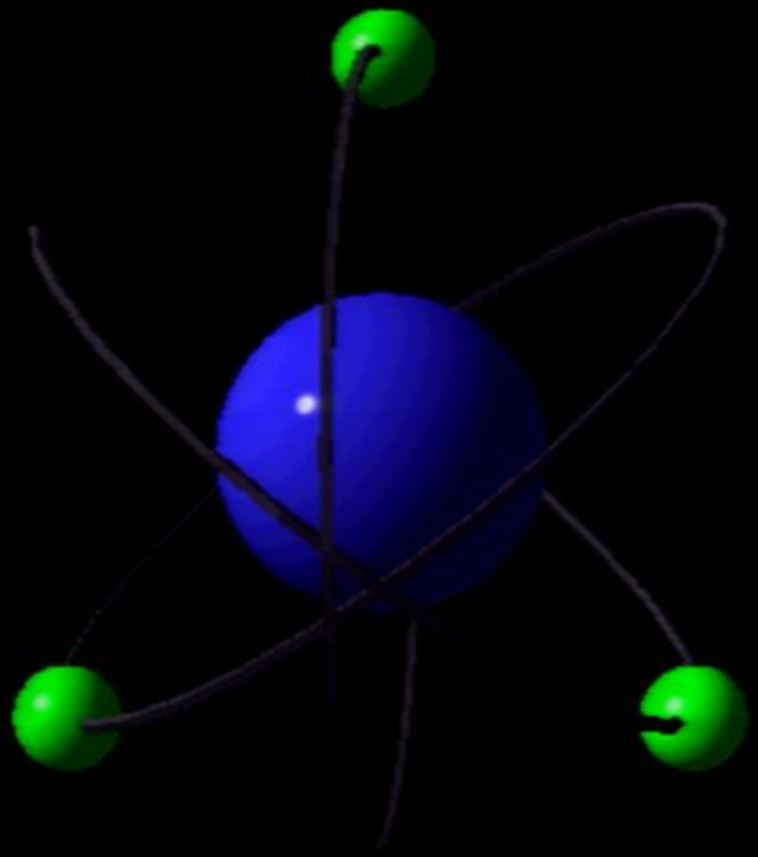
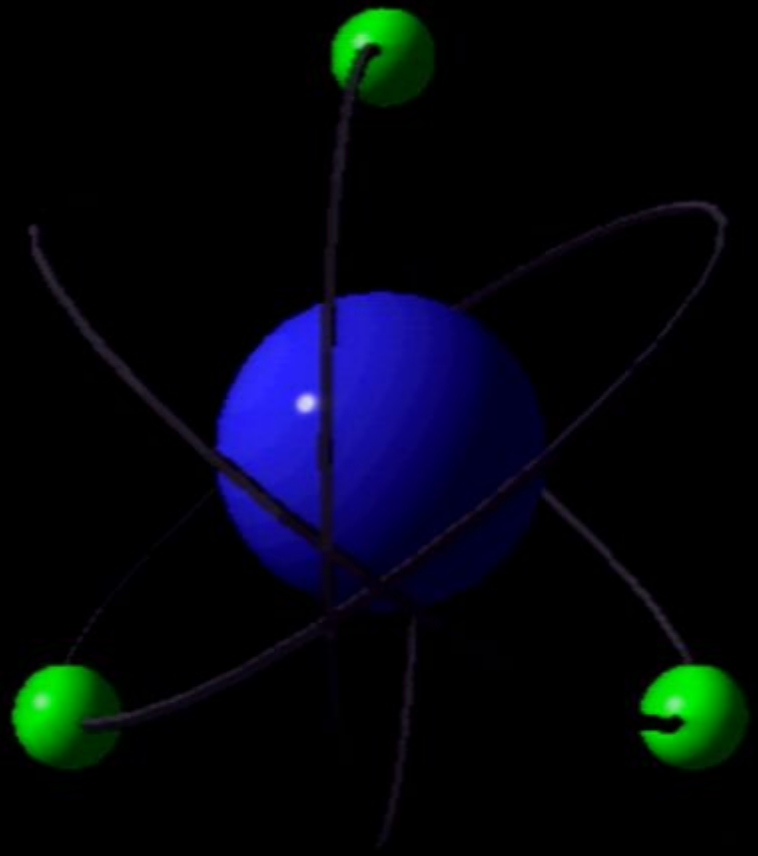
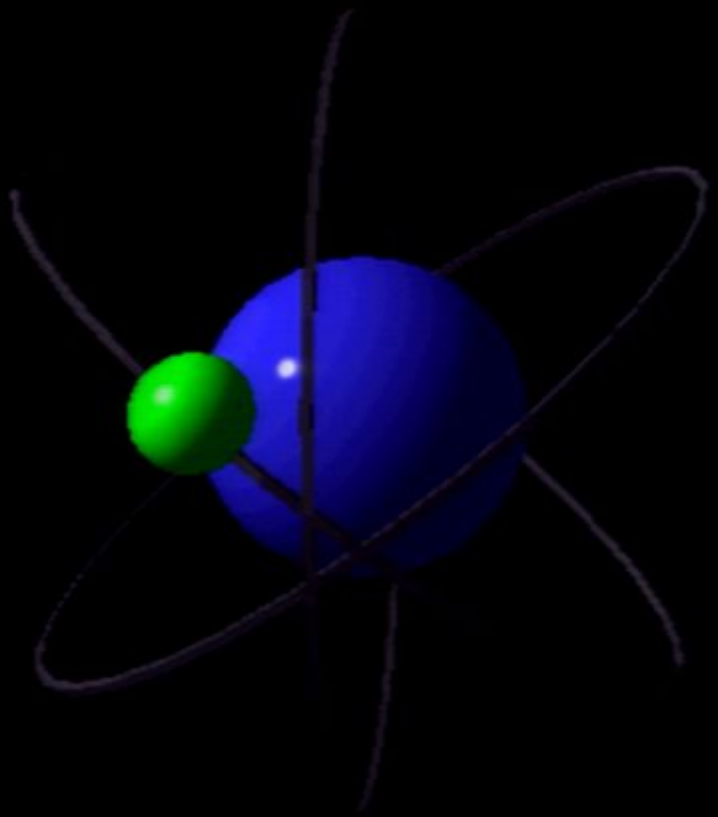


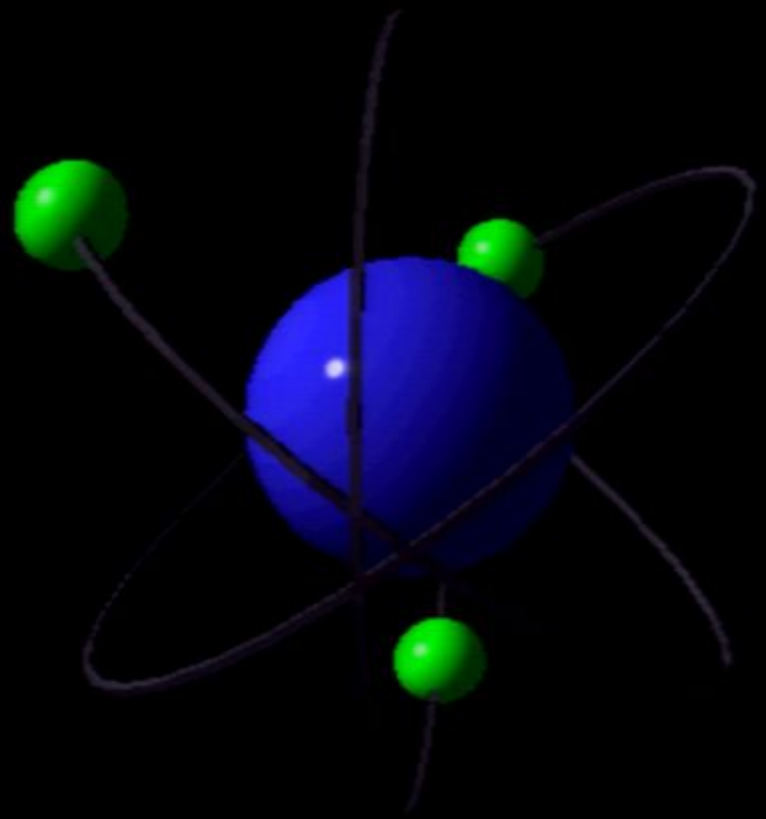
explore how can atoms exist?



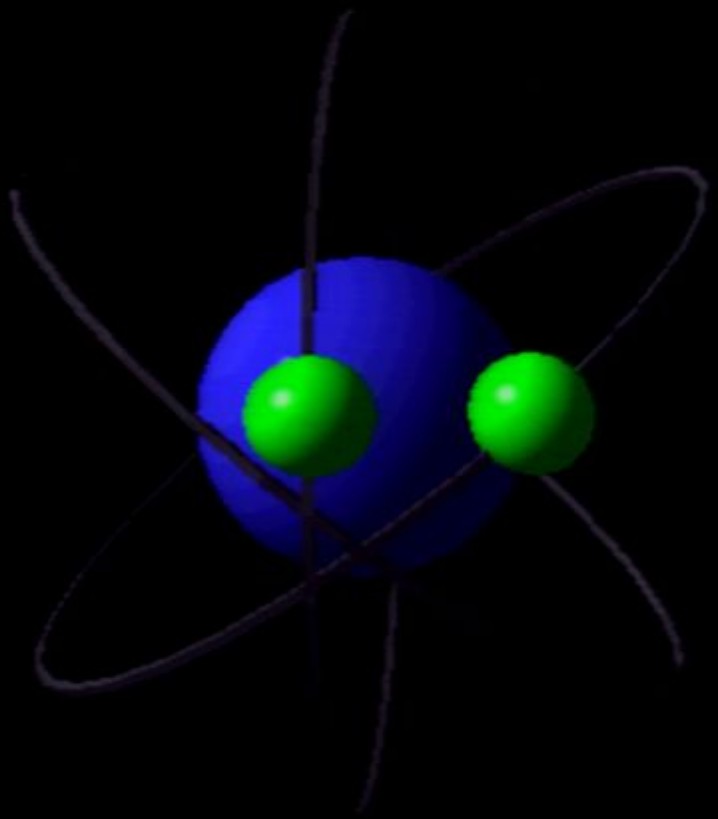
explore how can atoms exist?



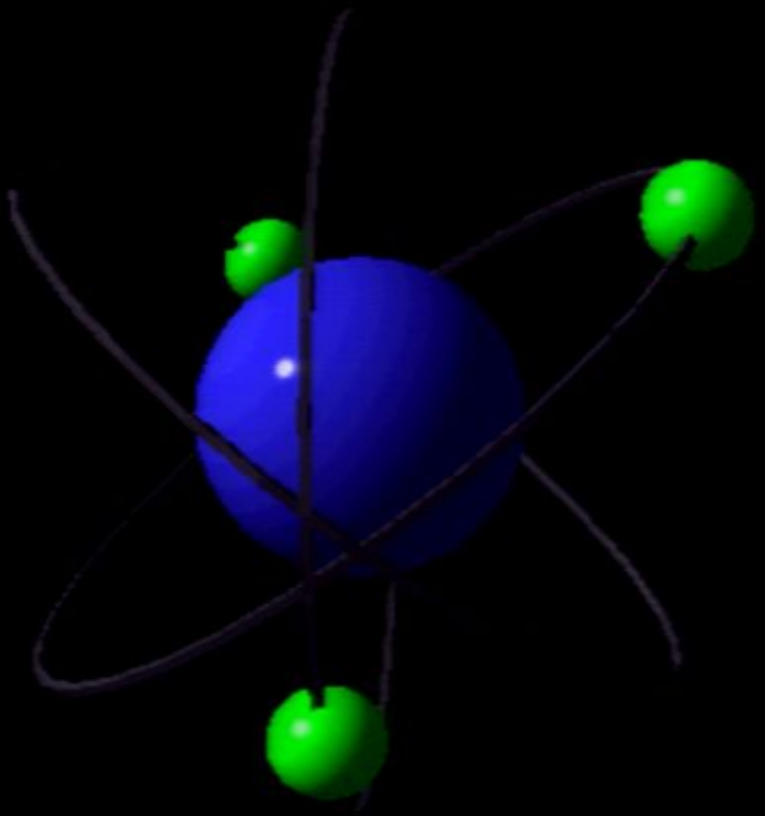
explore how can atoms exist?



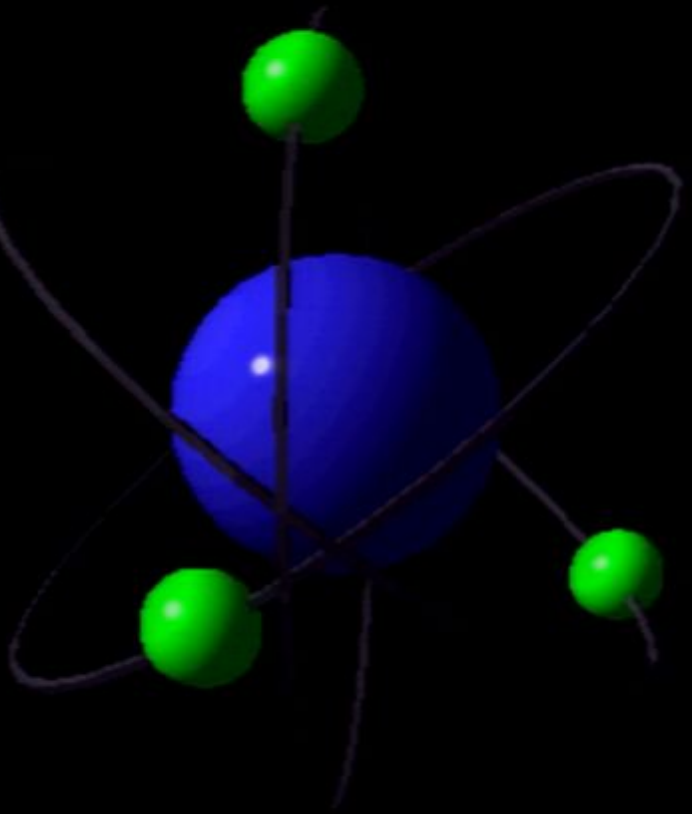
explore how can atoms exist?

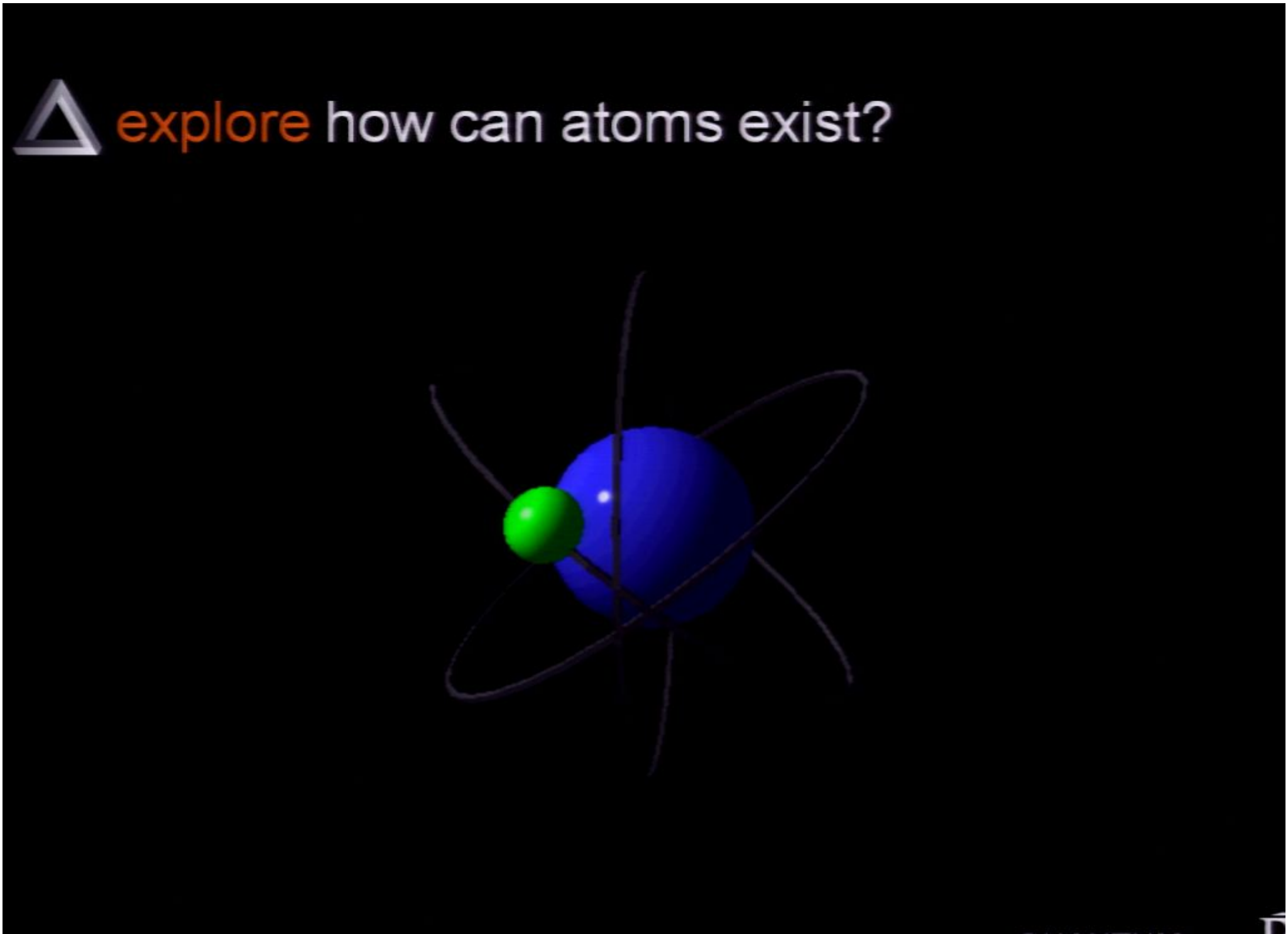


explore how can atoms exist?



explore how can atoms exist?

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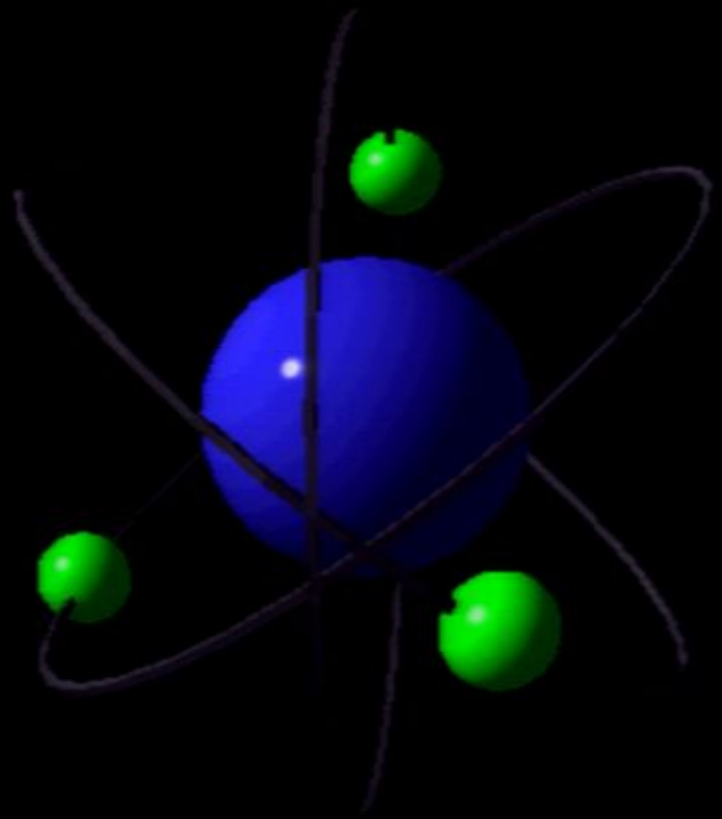

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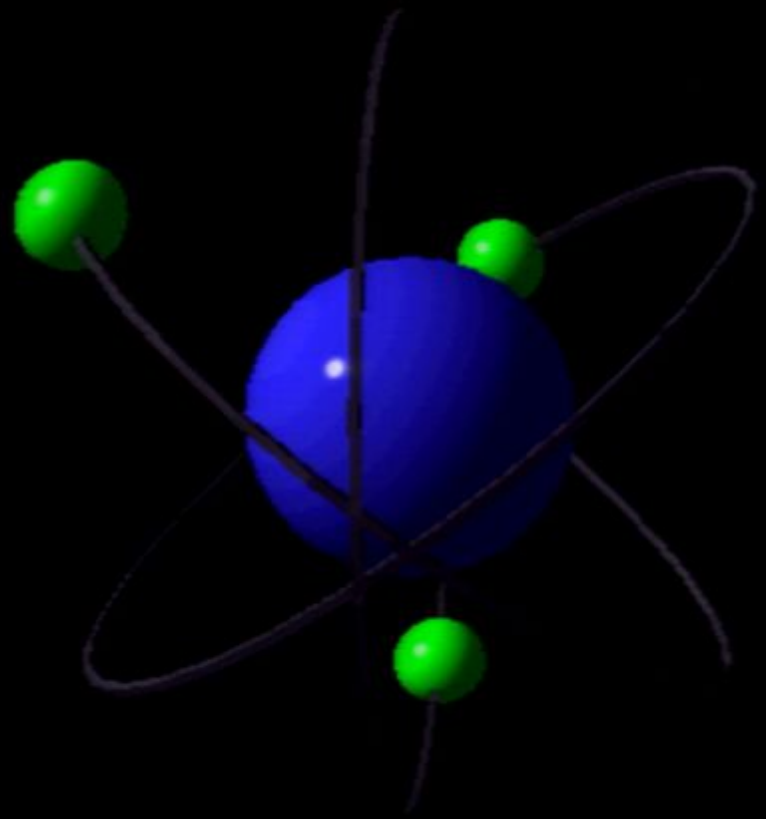

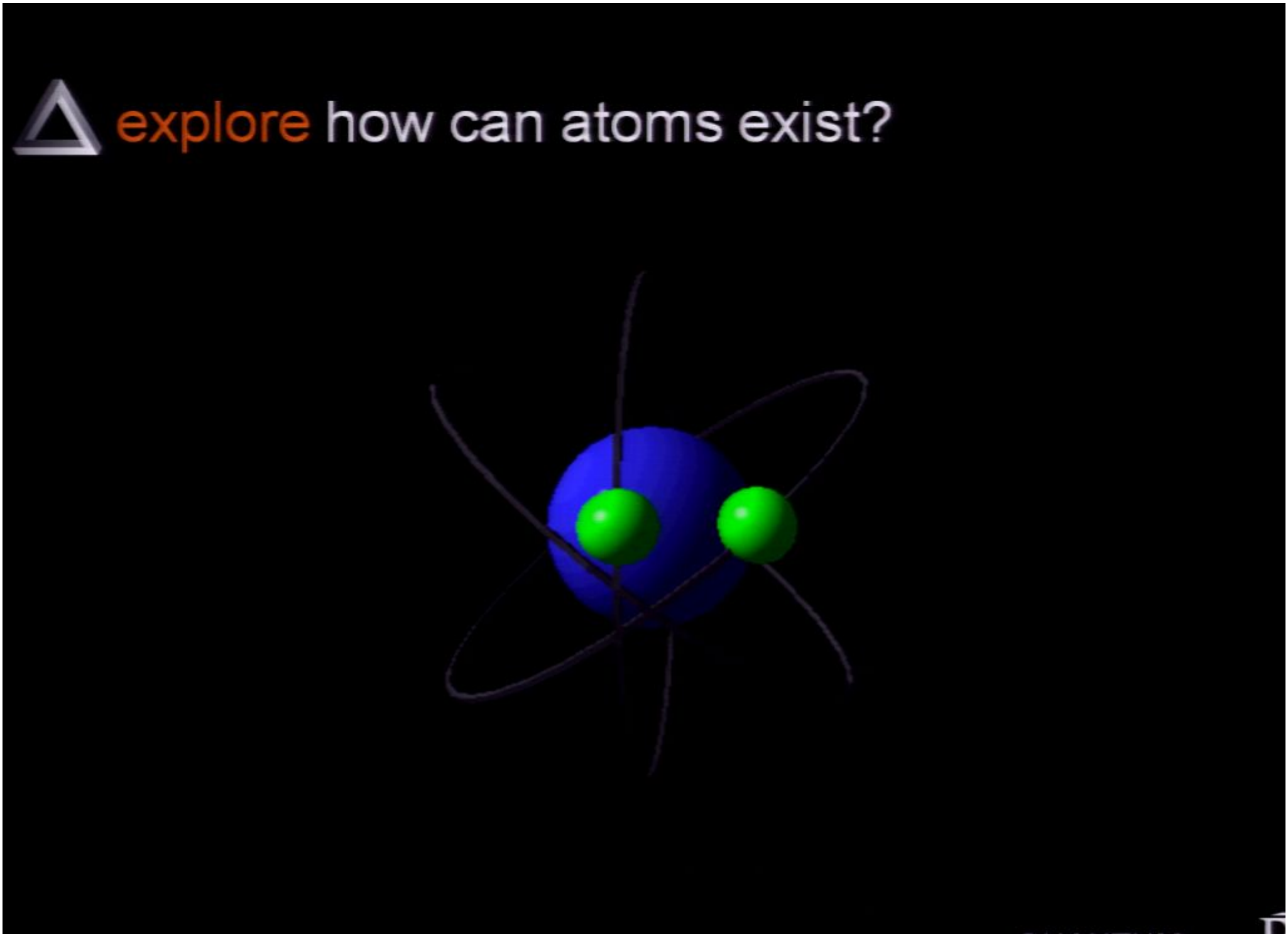
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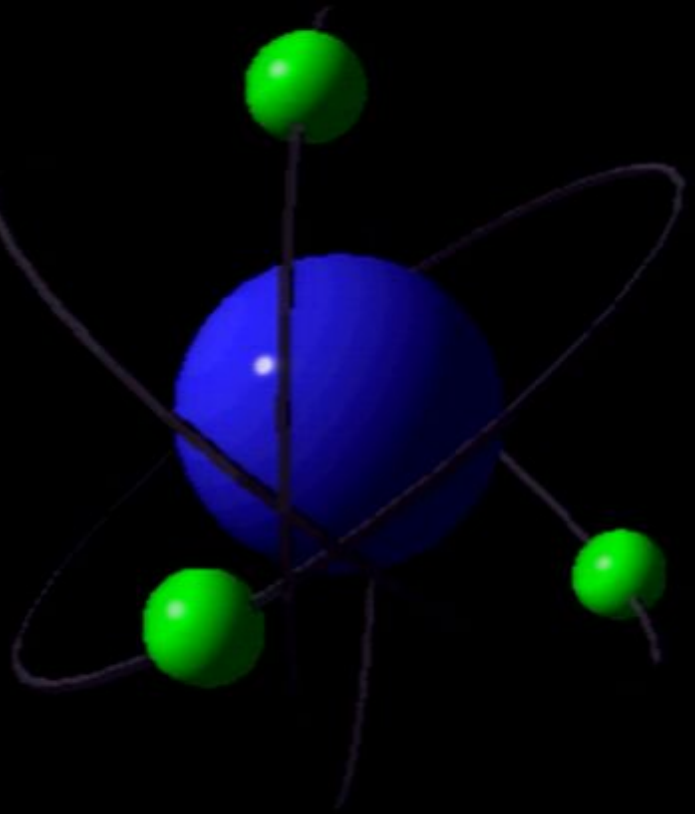

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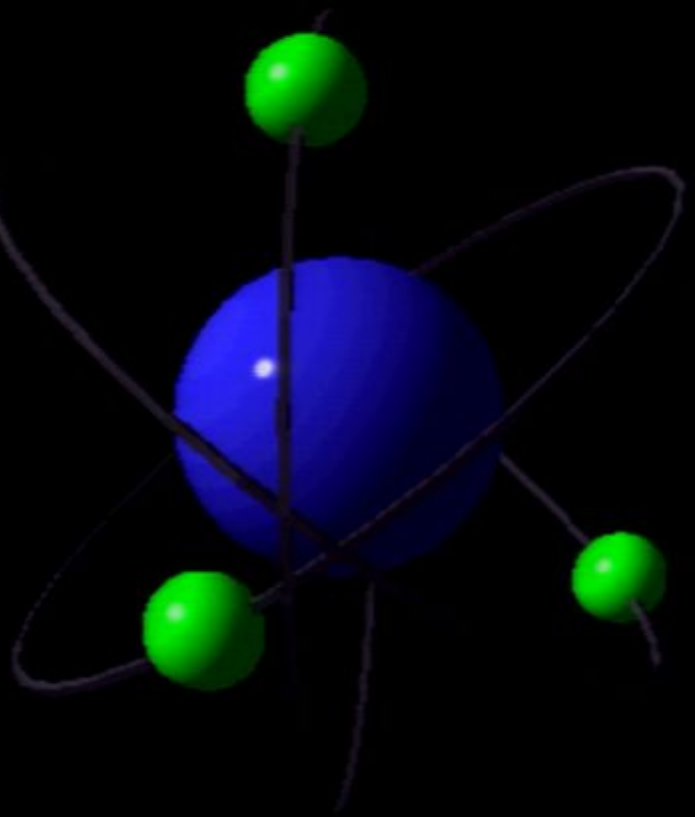
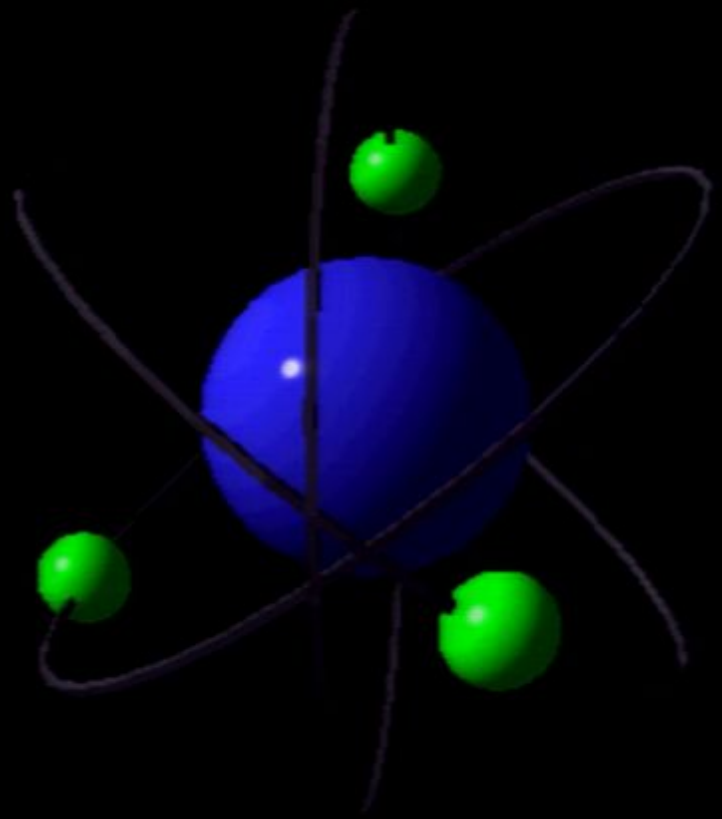
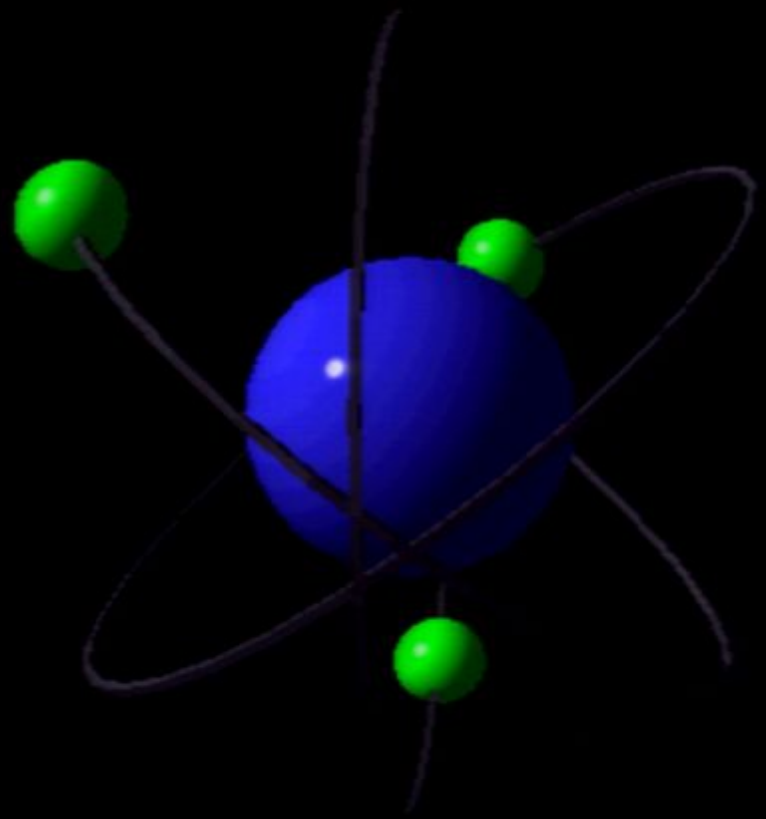


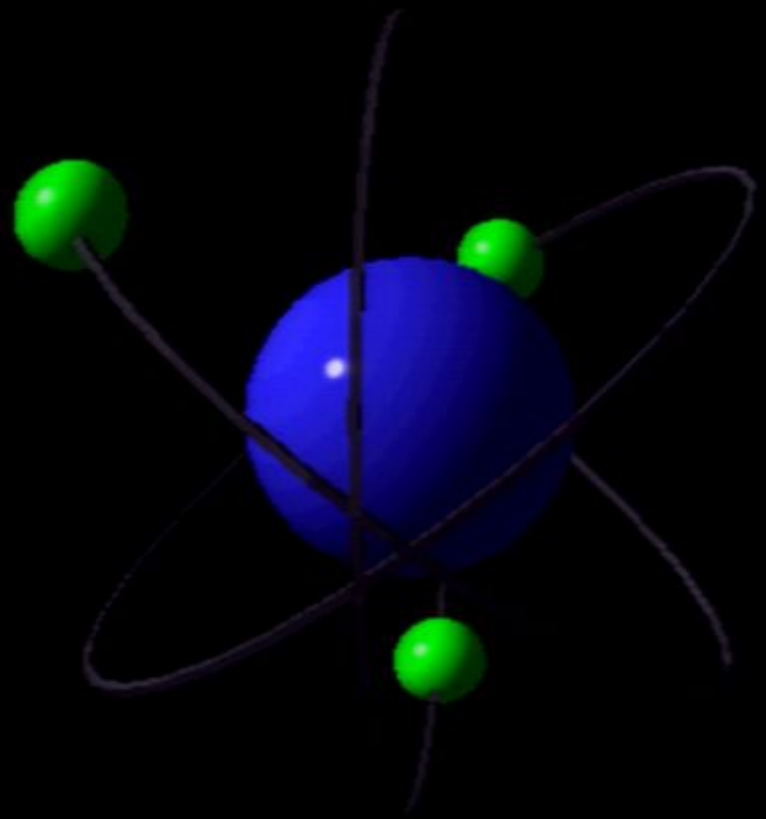
explore how can atoms exist?



explore how can atoms exist?



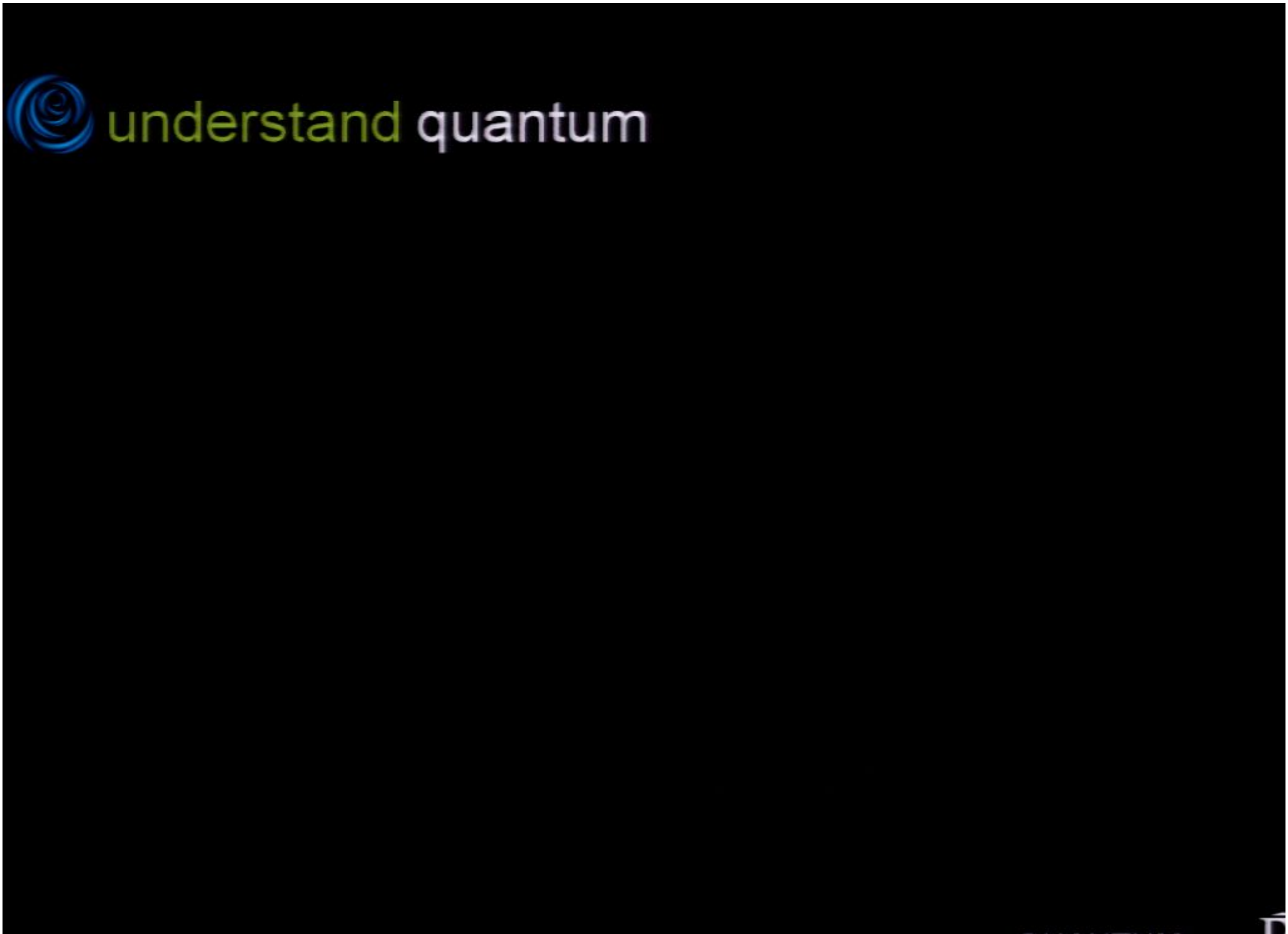
explore how can atoms exist?

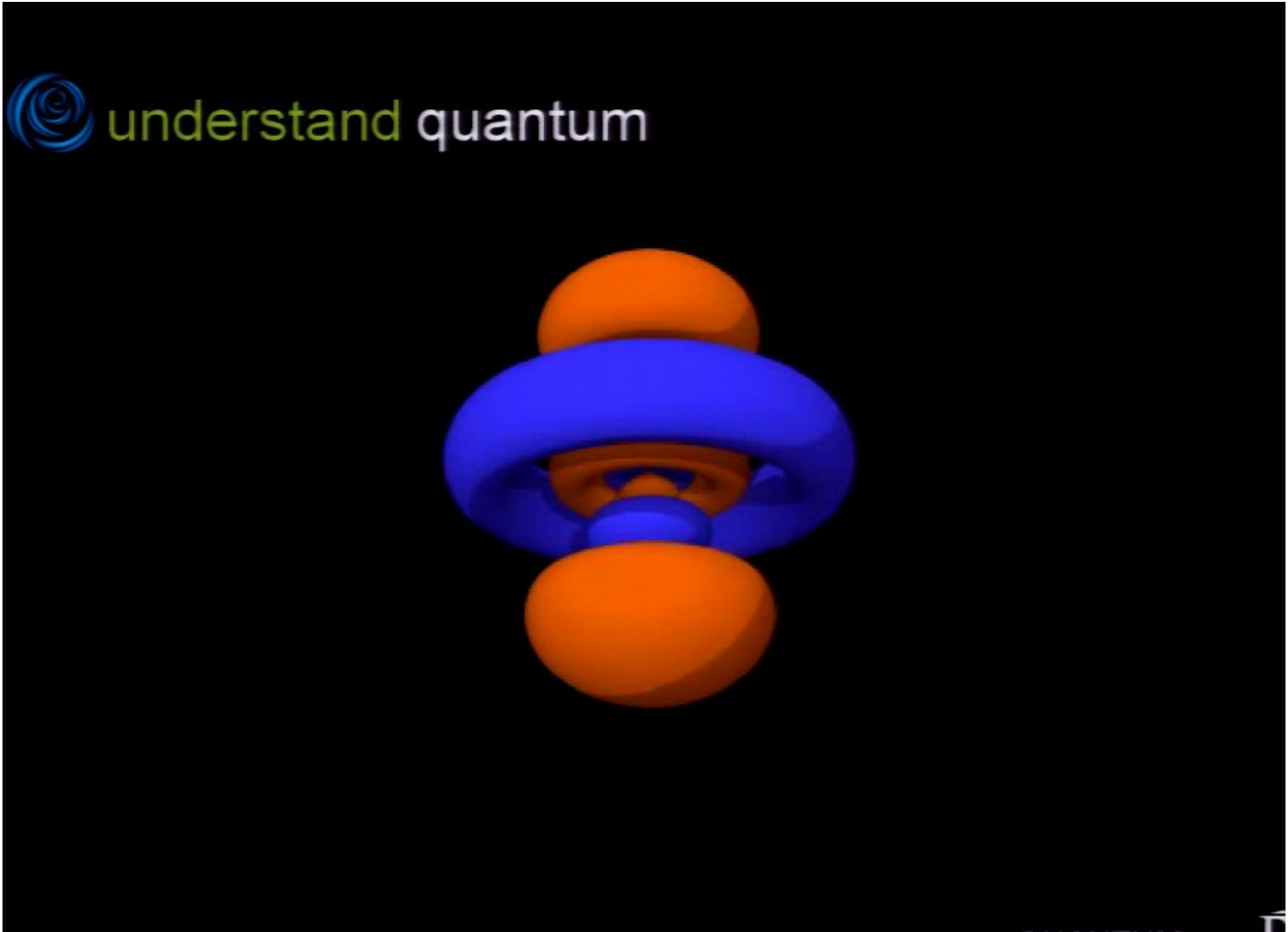


understand reality

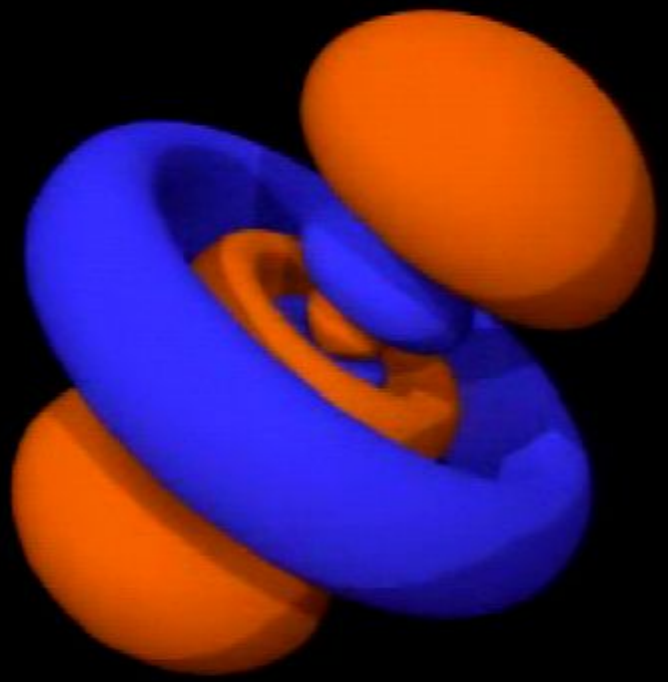
quantum

understand reality
quantum


understand quantum

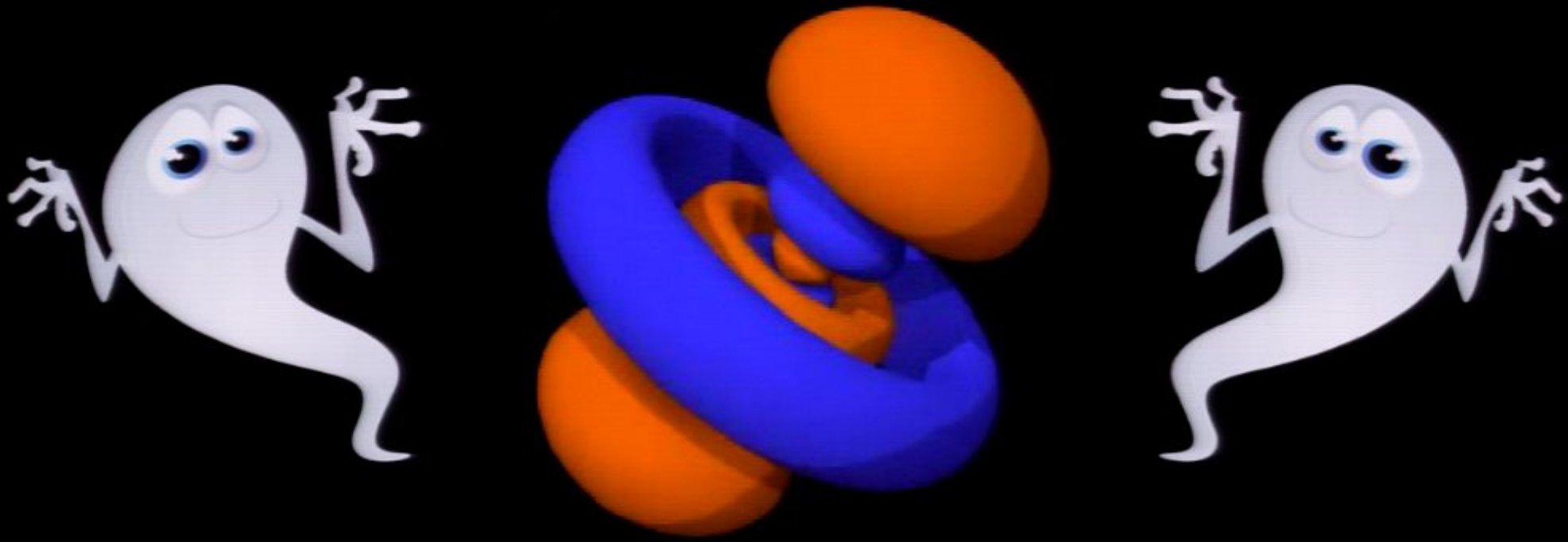

understand quantum

understand quantum



small is different

understand quantum



small is different

understand quantum

understand quantum

WHAT PART OF

$$i\hbar\frac{\partial}{\partial t}\Psi(\vec{r},t)=\left(-\frac{\hbar^2}{2m}\nabla^2+V(\vec{r},t)\right)\Psi(\vec{r},t)$$

DON'T YOU UNDERSTAND?

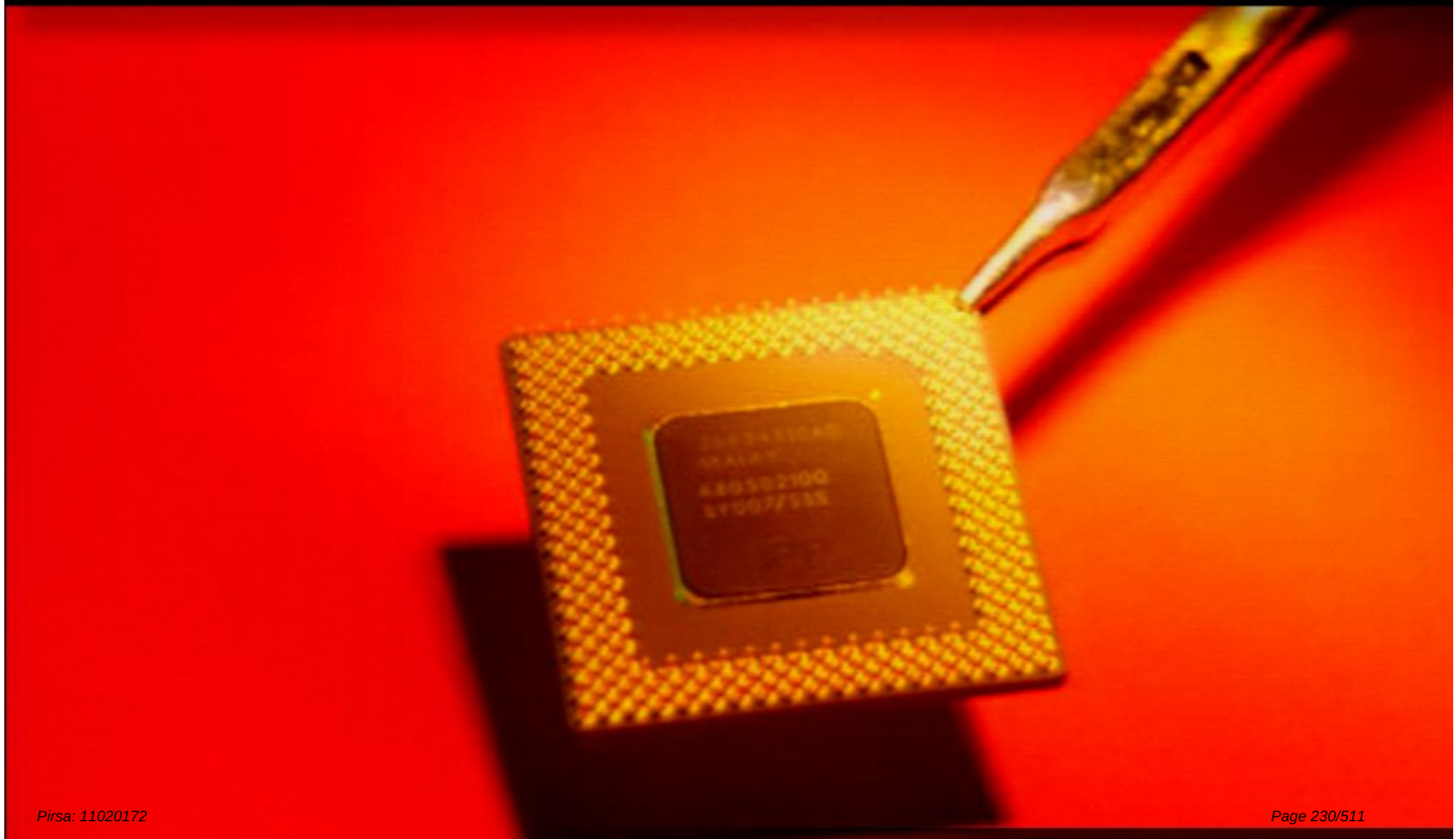
UBC PHYSICS

build cool stuff

build cool stuff

every electronic device on the planet

build electronic devices



build computers

build supercomputers

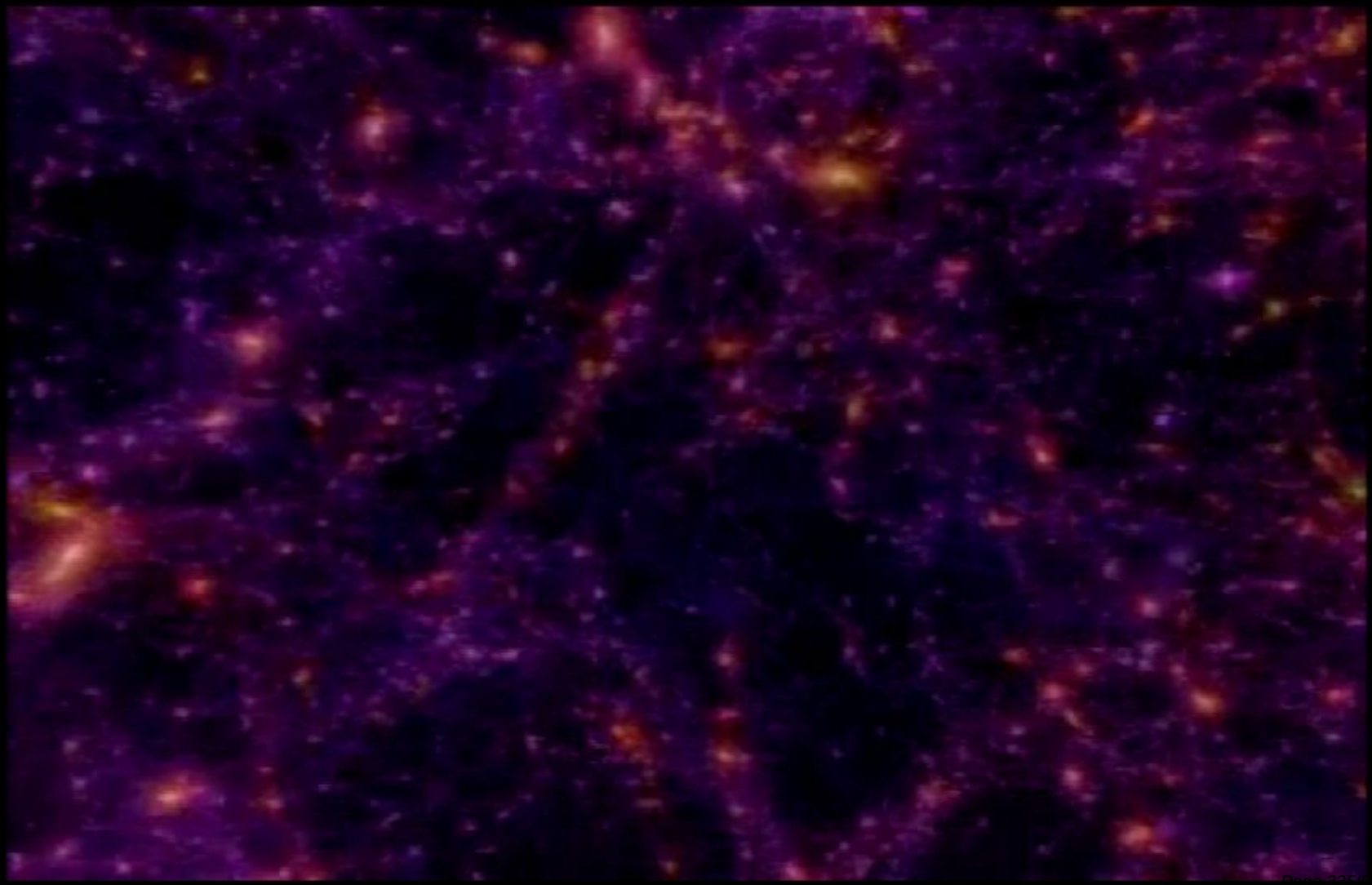
Simulated
Reality

build supercomputers

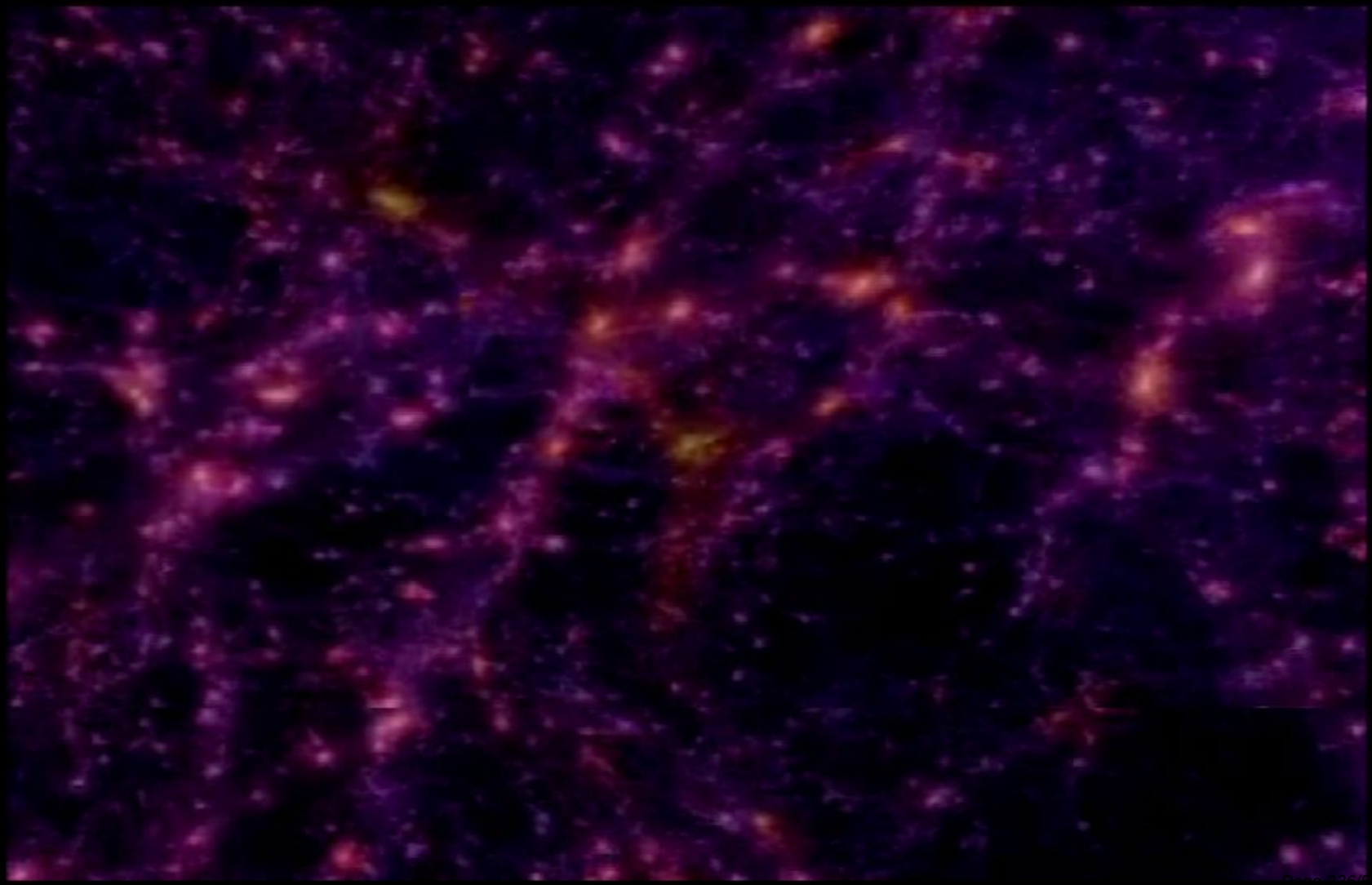
Simulated
Reality

build supercomputers

build supercomputers

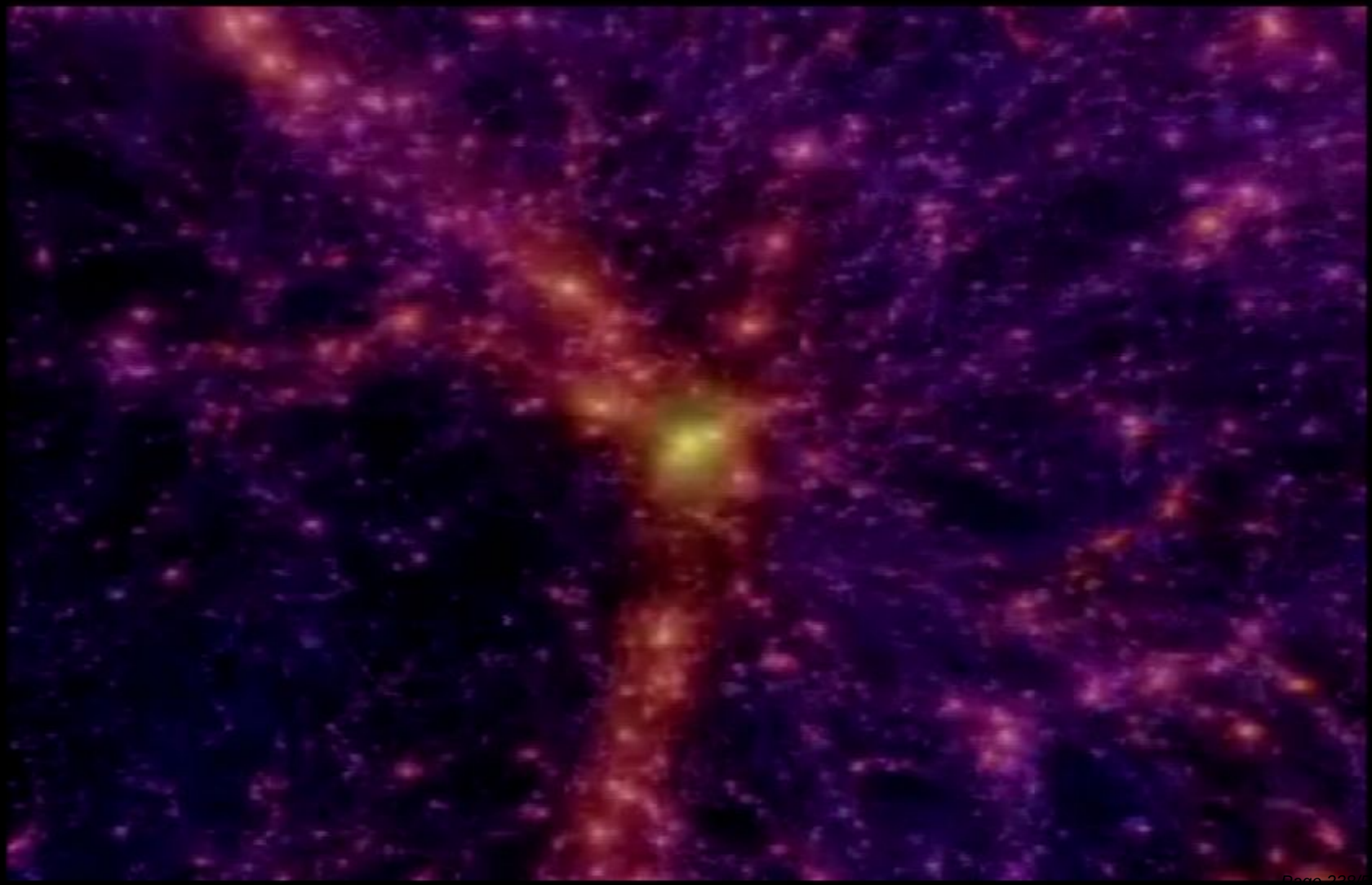


build supercomputers



build supercomputers

build supercomputers



build supercomputers

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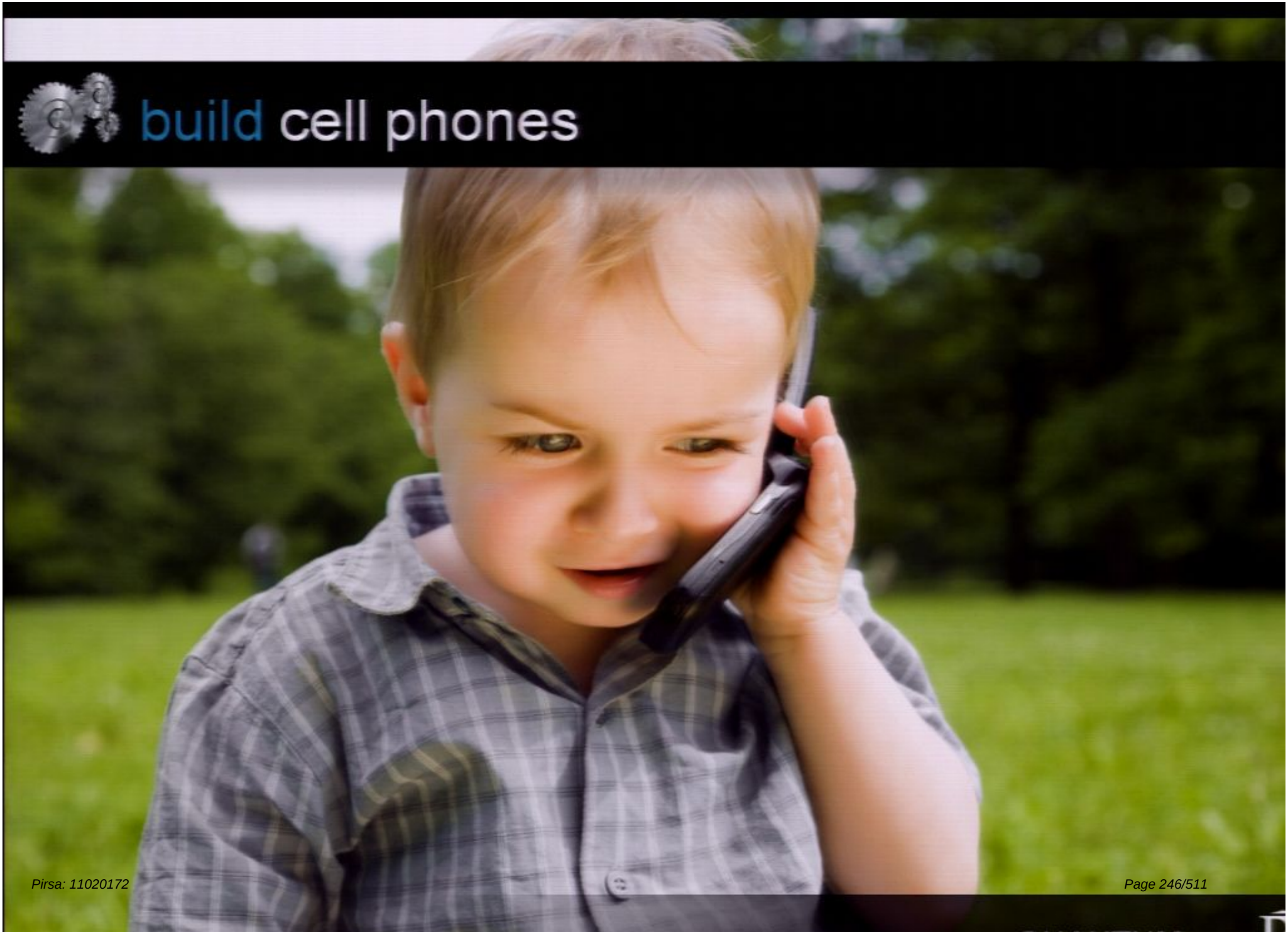
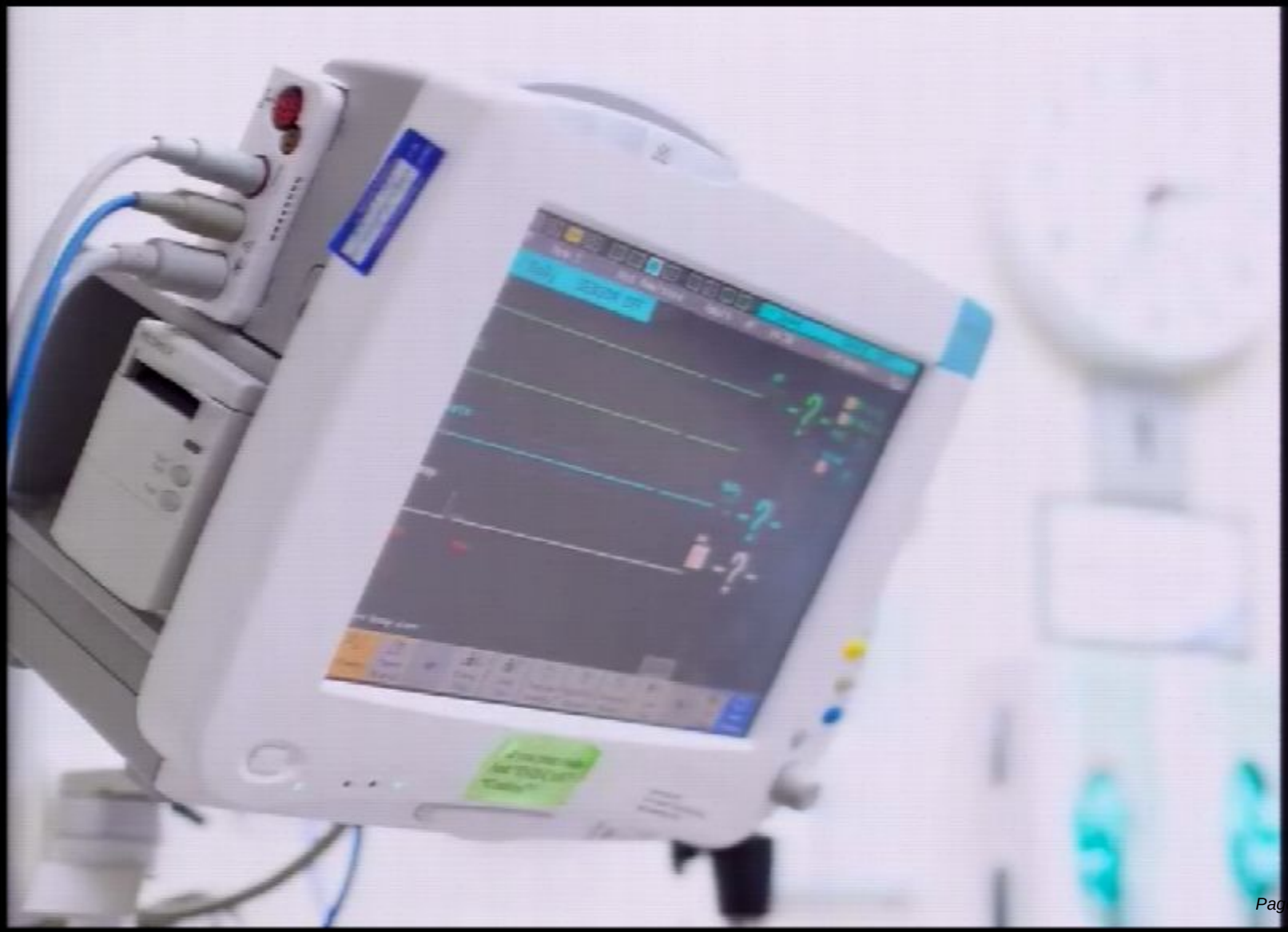
build supercomputers


build cell phones

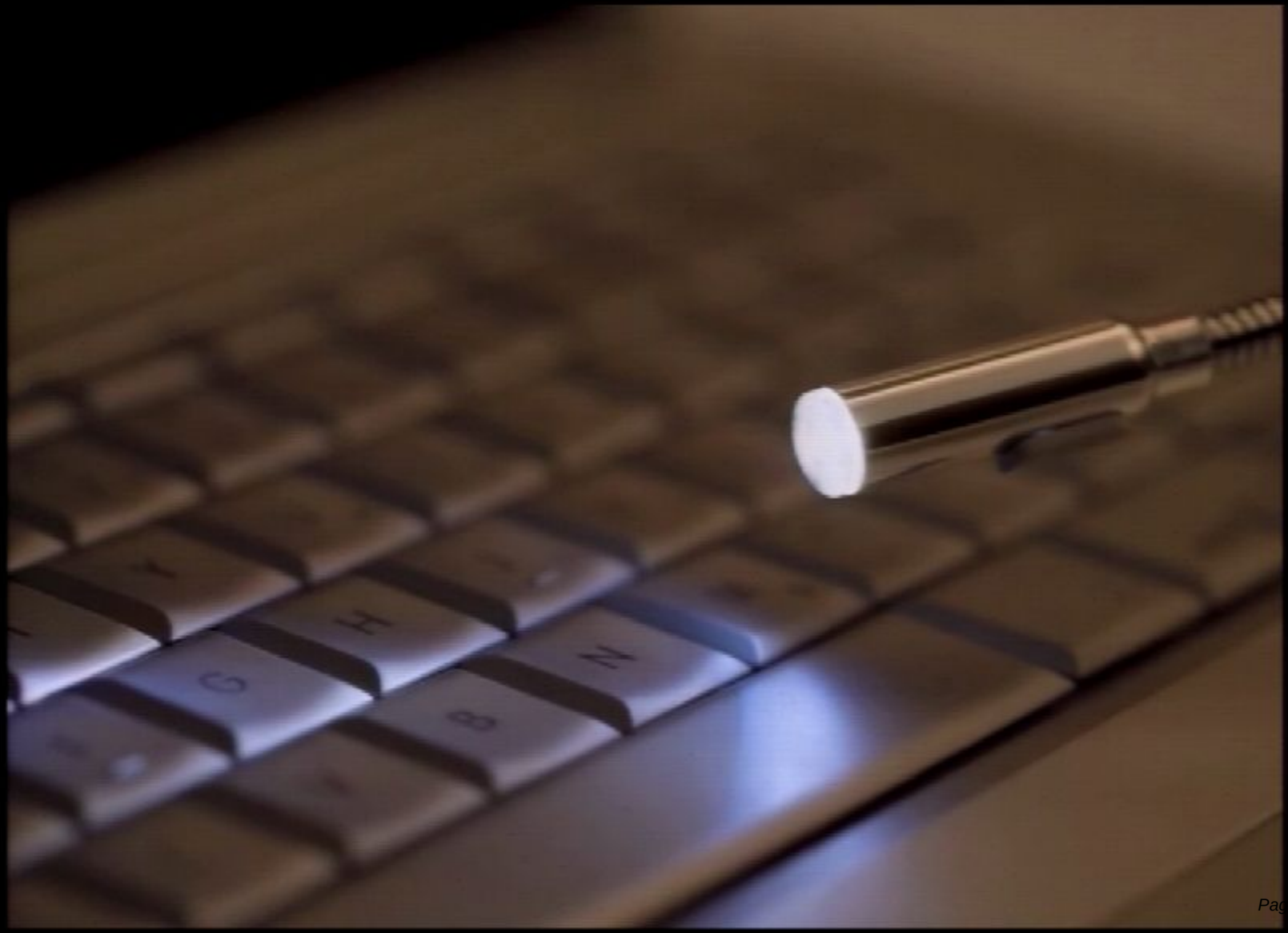
build electronics everywhere

build electronics everywhere

build electronics everywhere



build electronics everywhere



build electronics everywhere

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build electronics everywhere

build electronics everywhere

build electronics everywhere

build cool stuff

lasers

build cool stuff

lasers

build cool stuff

lasers

build lasers

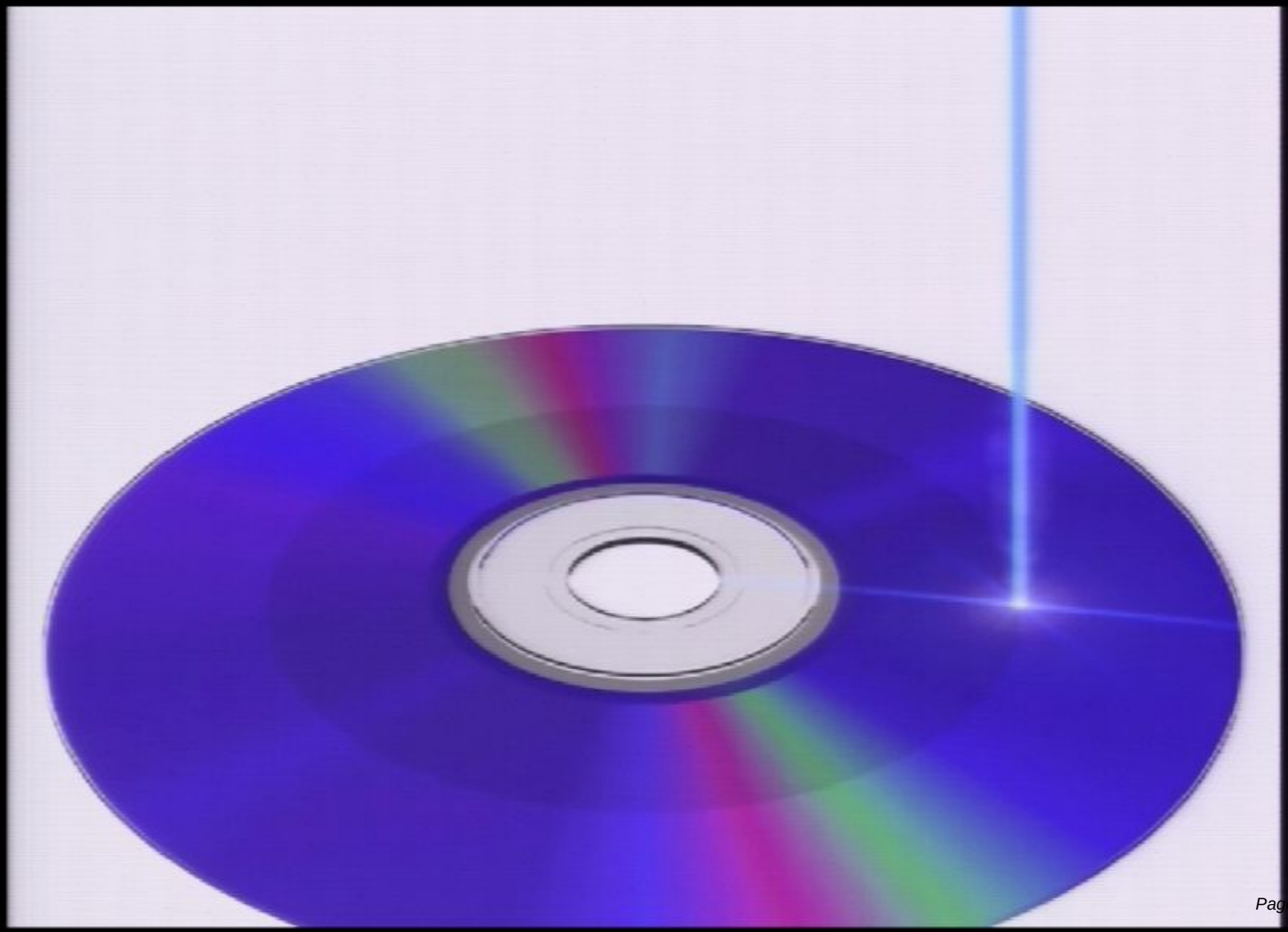
build lasers

build lasers

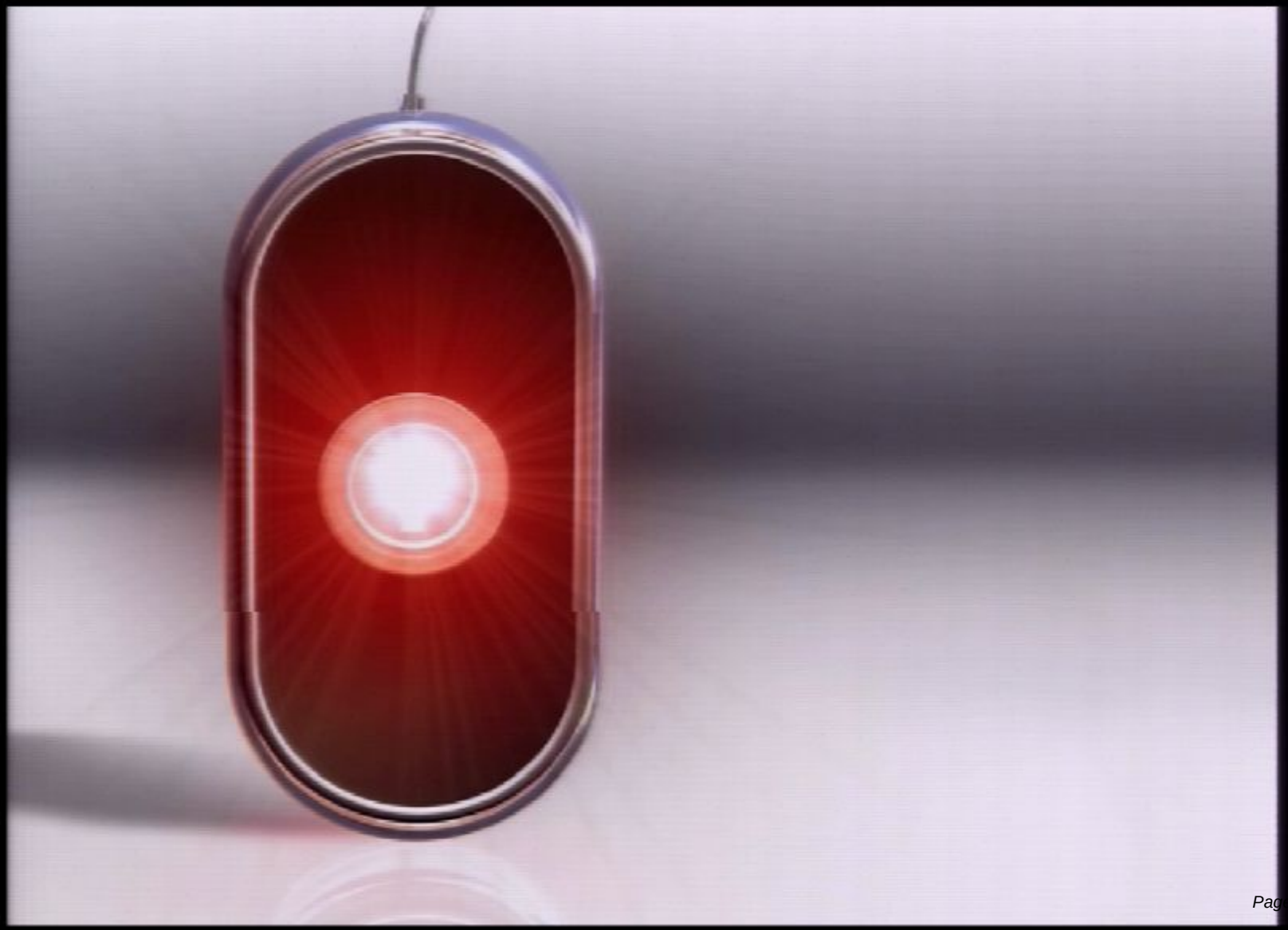
build lasers

build lasers

build lasers



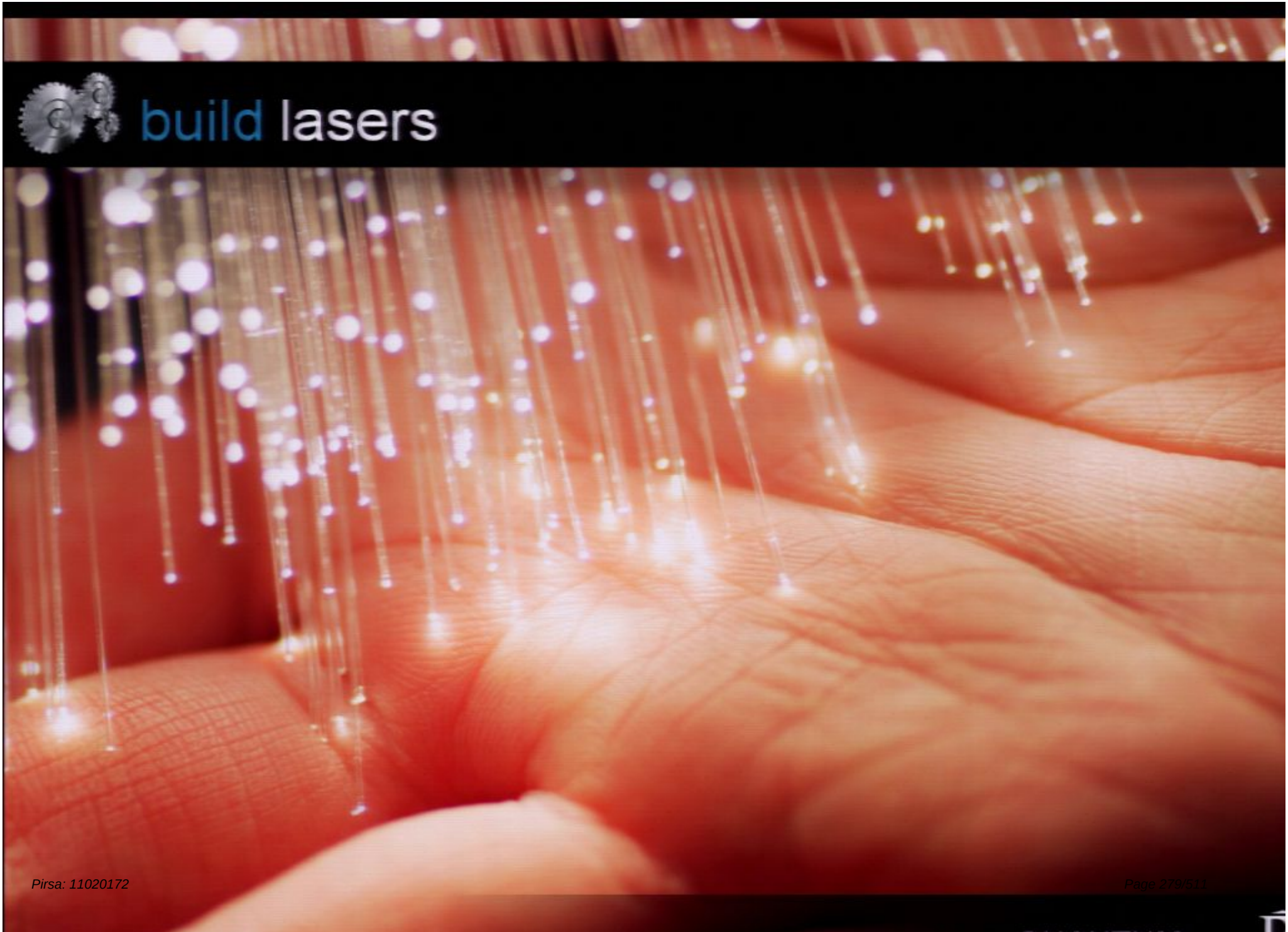
build lasers



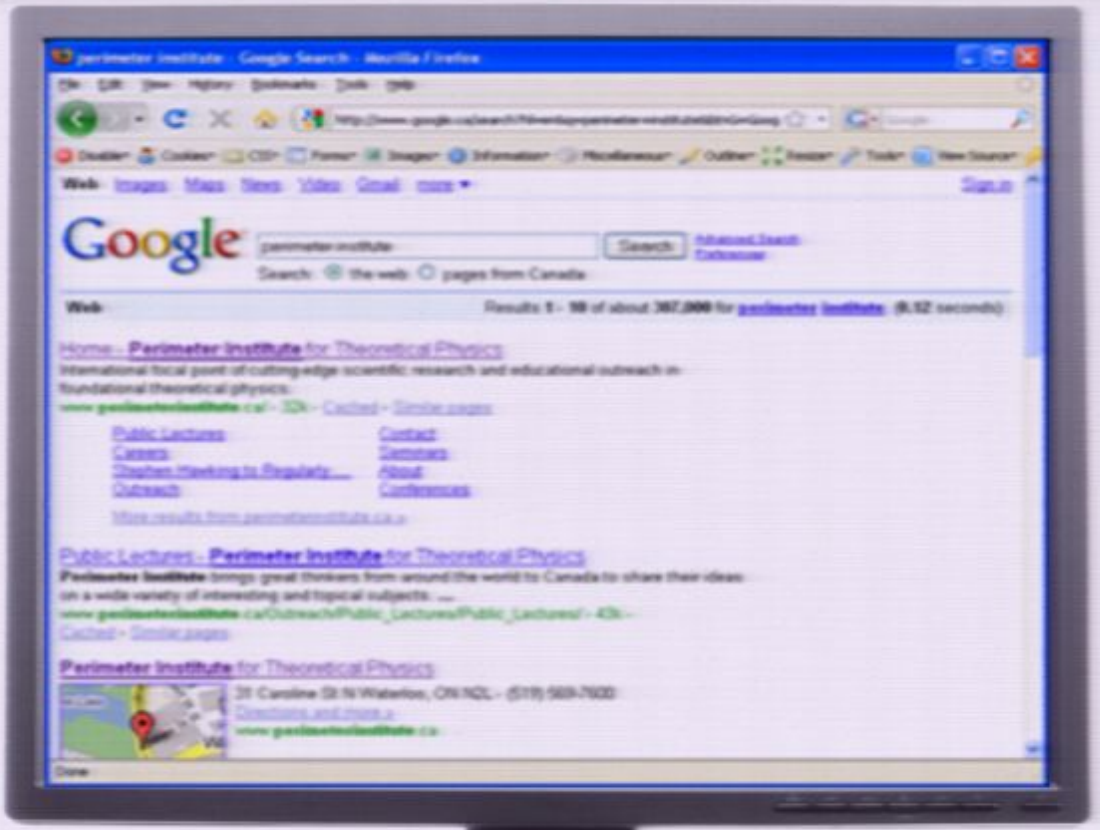
build lasers

build lasers

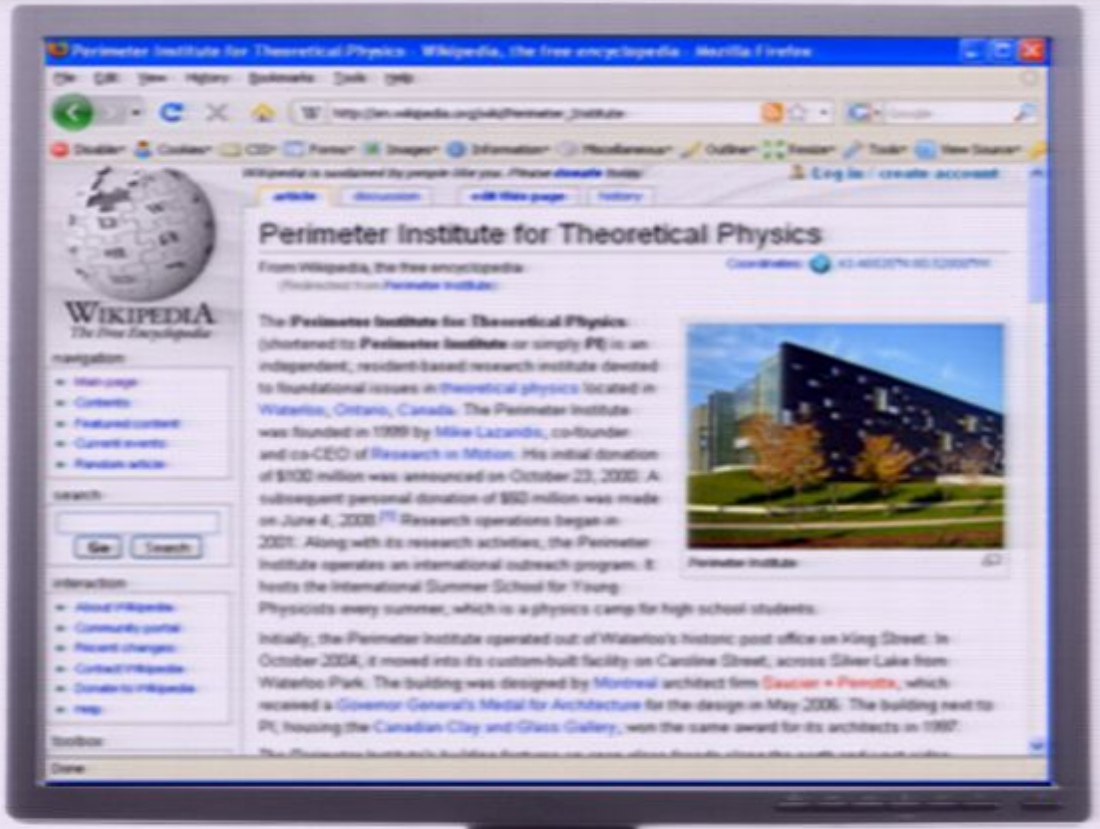
build lasers


build lasers

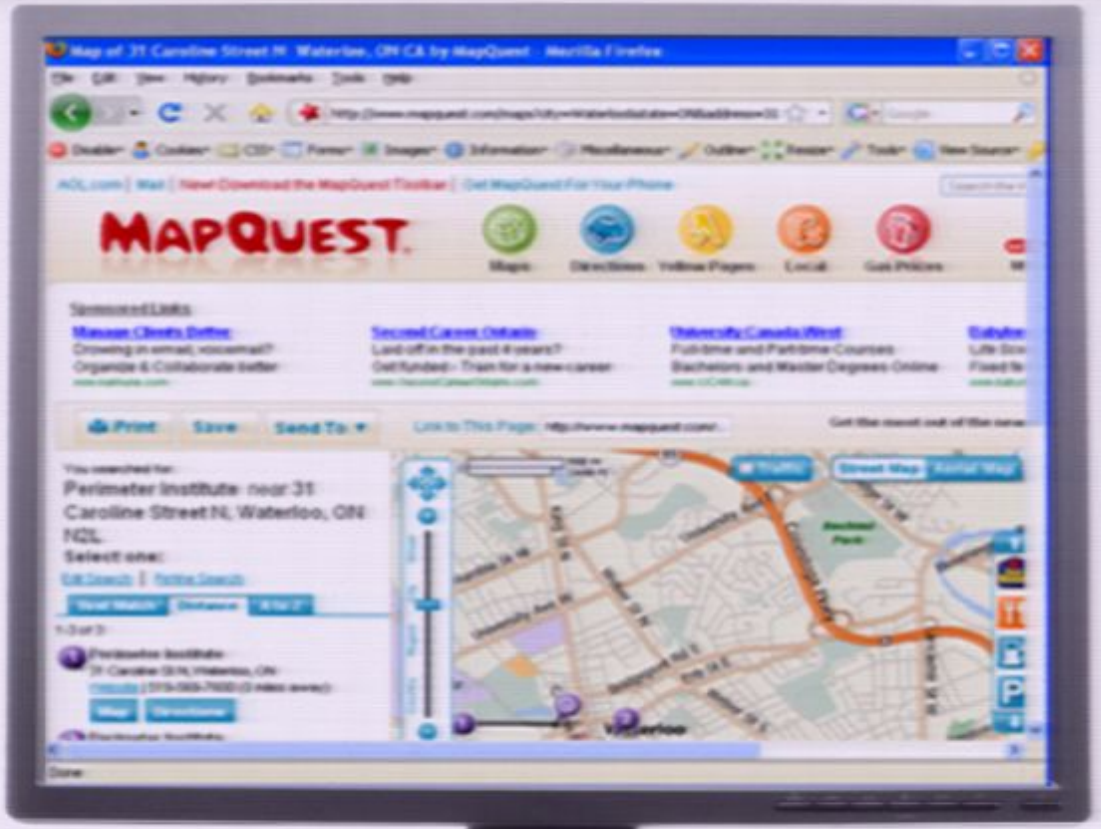
build internet



build internet



build internet

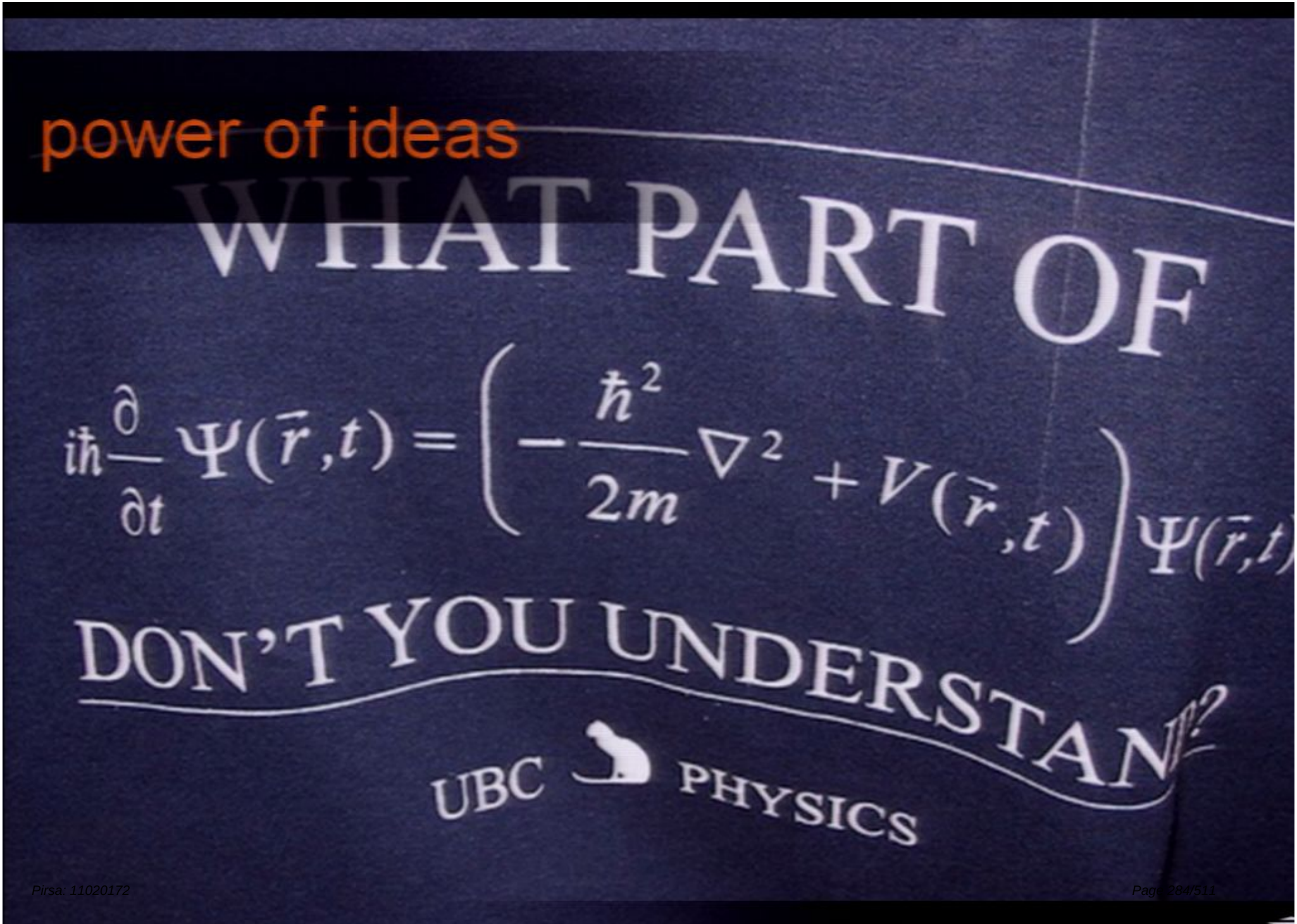


WHAT PART OF

$$i\hbar\frac{\partial}{\partial t}\Psi(\vec{r},t) = \left(-\frac{\hbar^2}{2m}\nabla^2 + V(\vec{r},t)\right)\Psi(\vec{r},t)$$

DON'T YOU UNDERSTAND?

UBC PHYSICS


power of ideas
WHAT PART OF
$i\hbar\frac{\partial}{\partial t}\Psi(\vec{r},t) = \left(-\frac{\hbar^2}{2m}\nabla^2 + V(\vec{r},t)\right)\Psi(\vec{r},t)$
DON'T YOU UNDERSTAND?
UBC PHYSICS

build cool stuff

more quantum stuff

build cool stuff

more quantum stuff

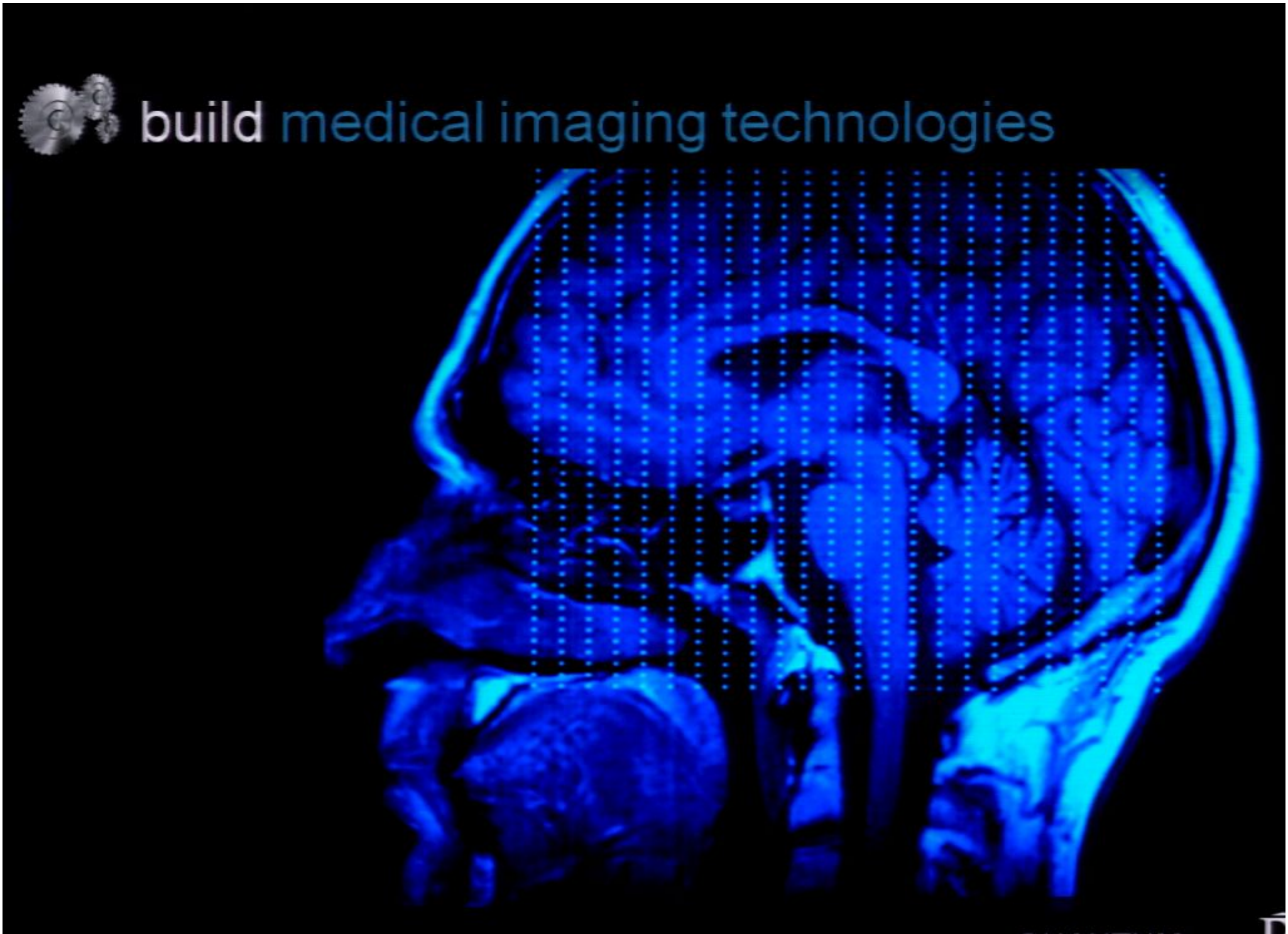
build cool stuff

more quantum stuff

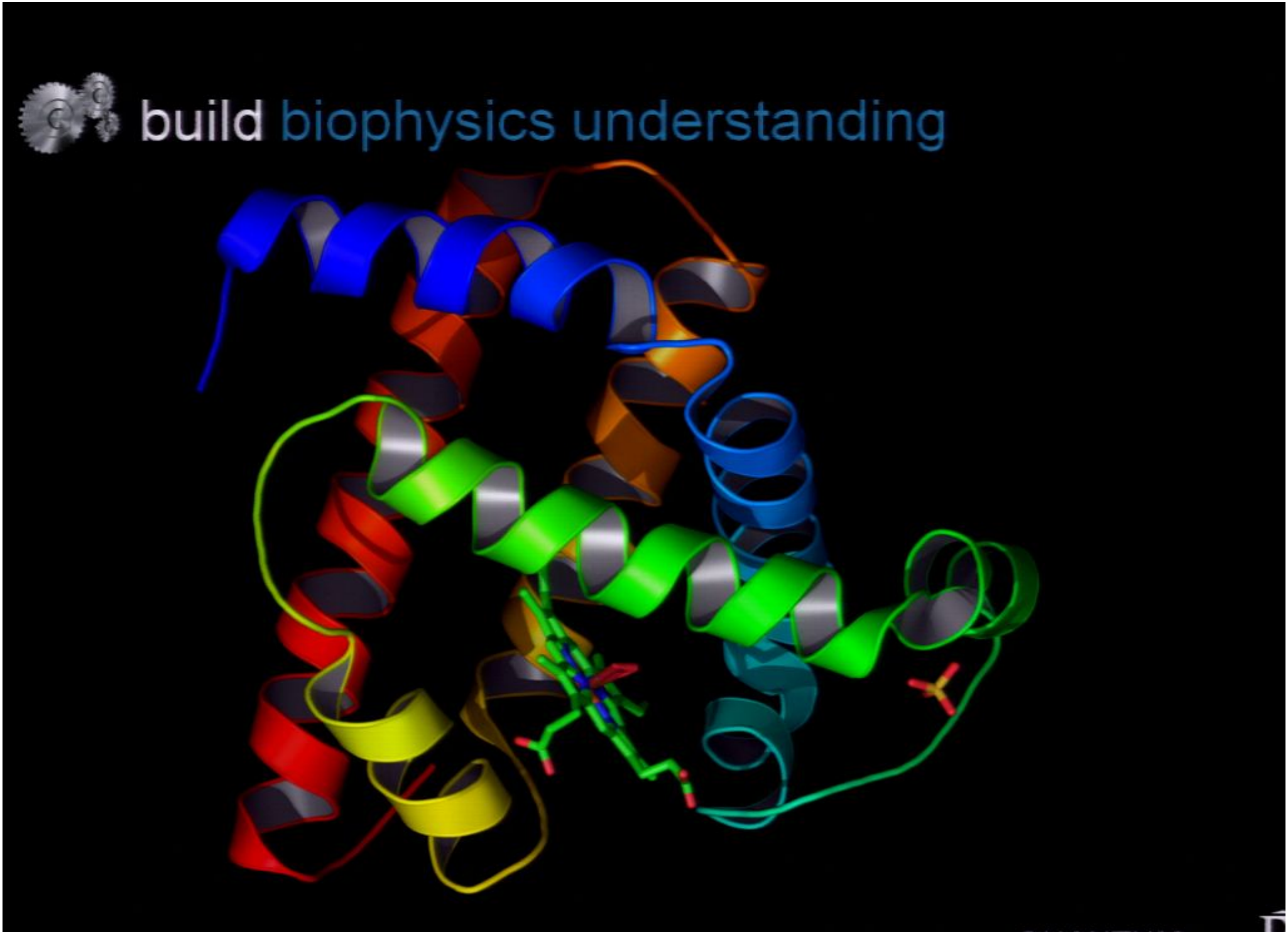
build cool stuff

more quantum stuff

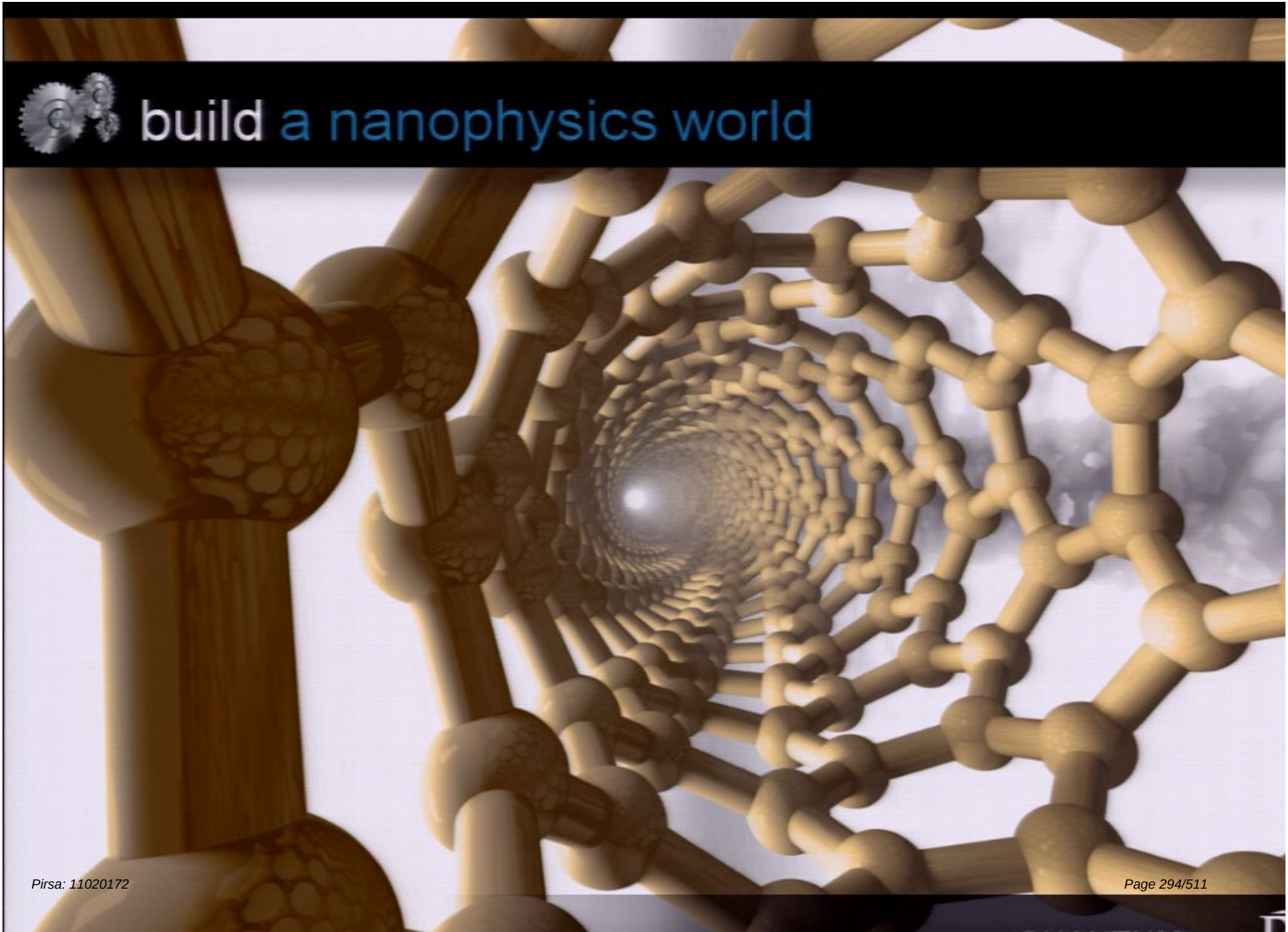
build medical imaging technologies

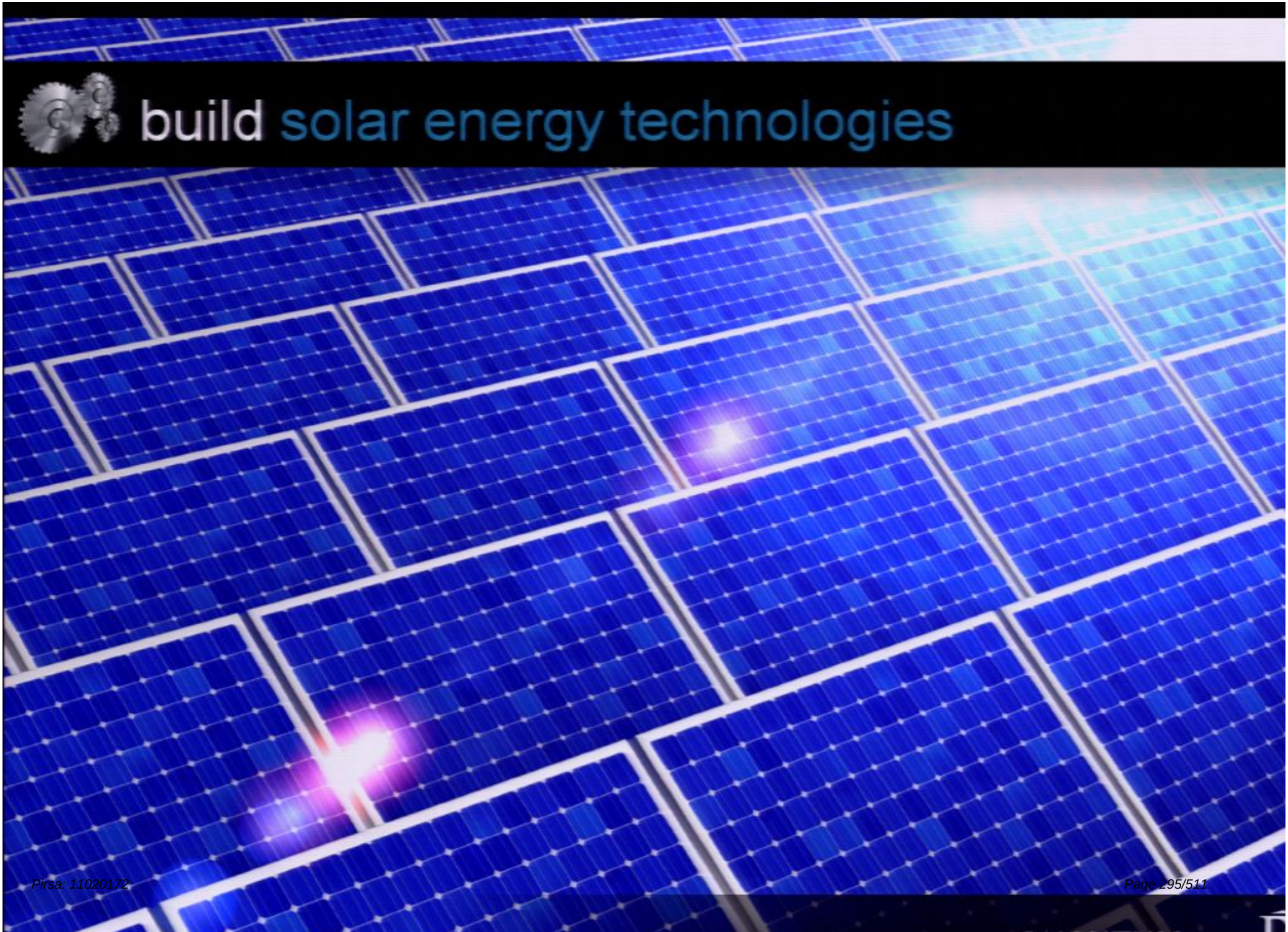

build medical imaging technologies

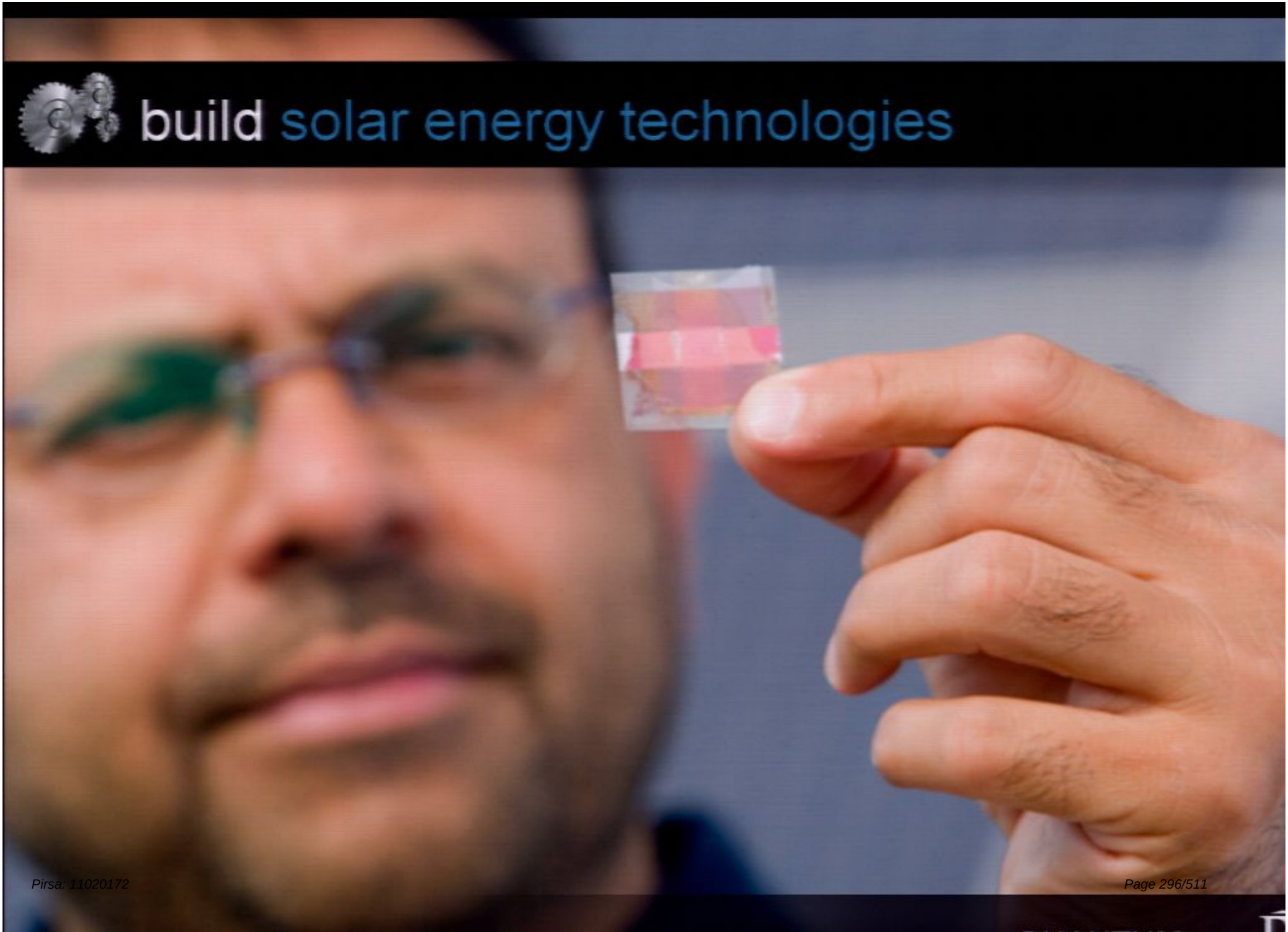
build biophysics understanding


build biophysics understanding

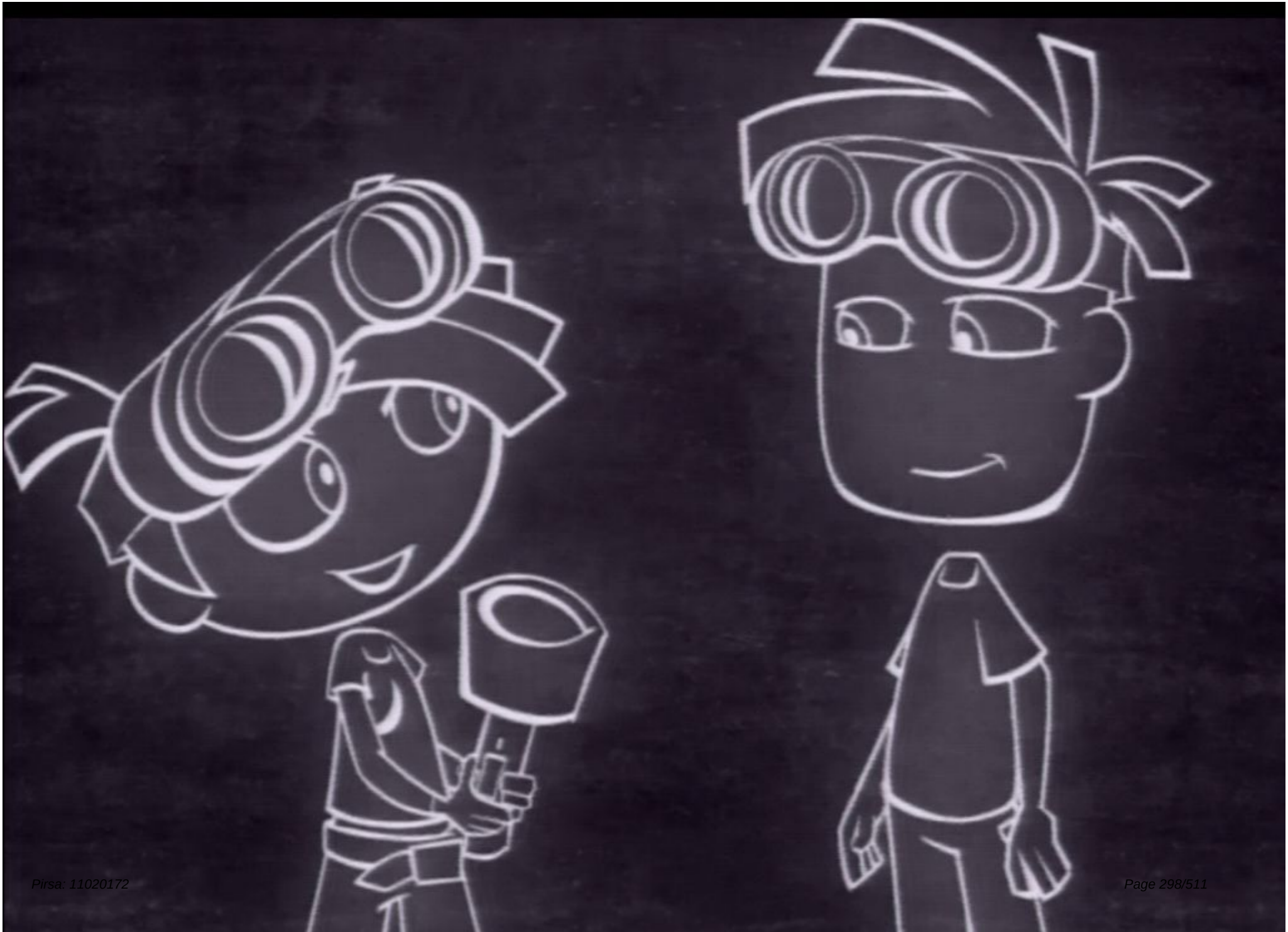
build a nanophysics world

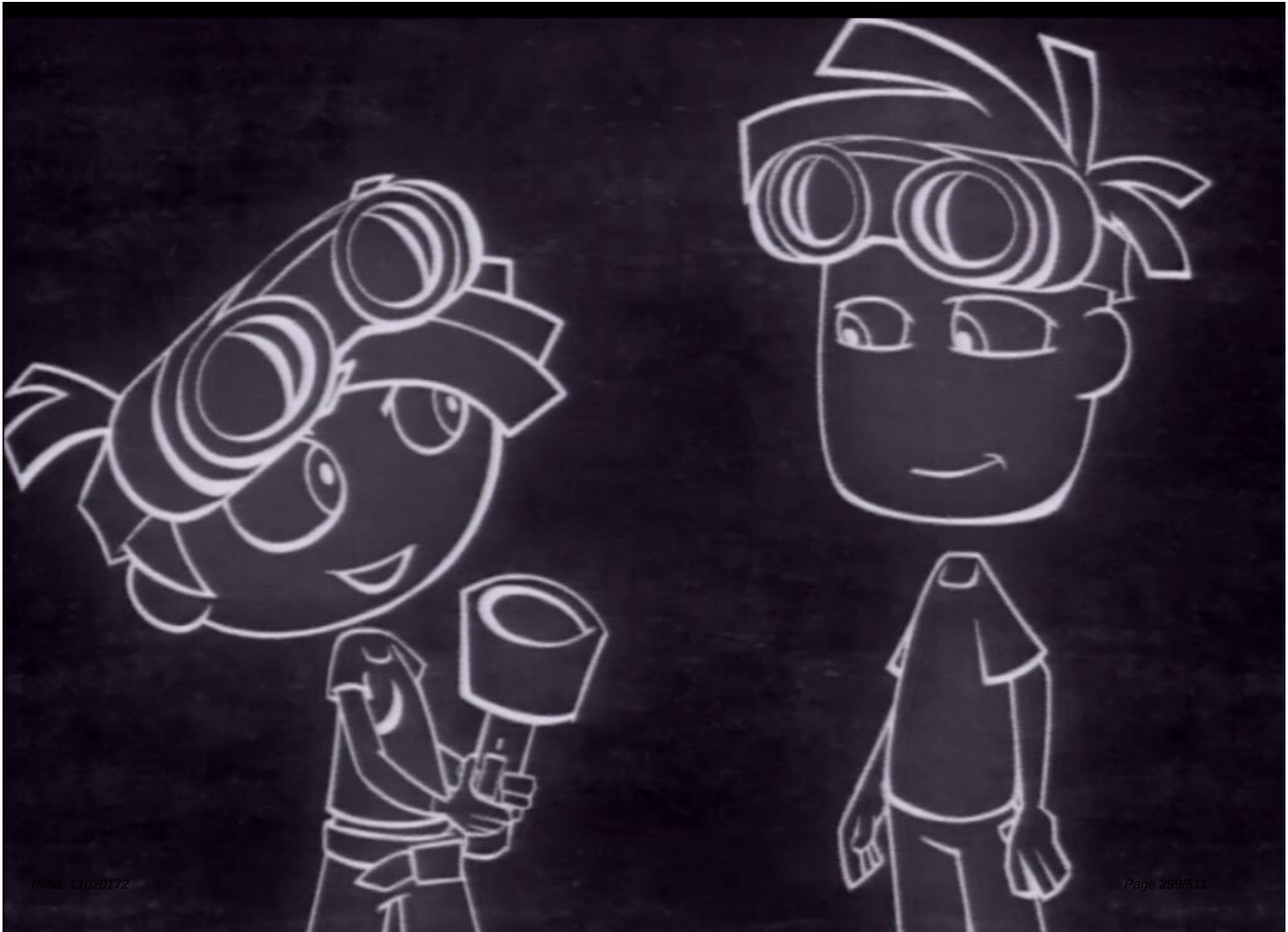

build a nanophysics world

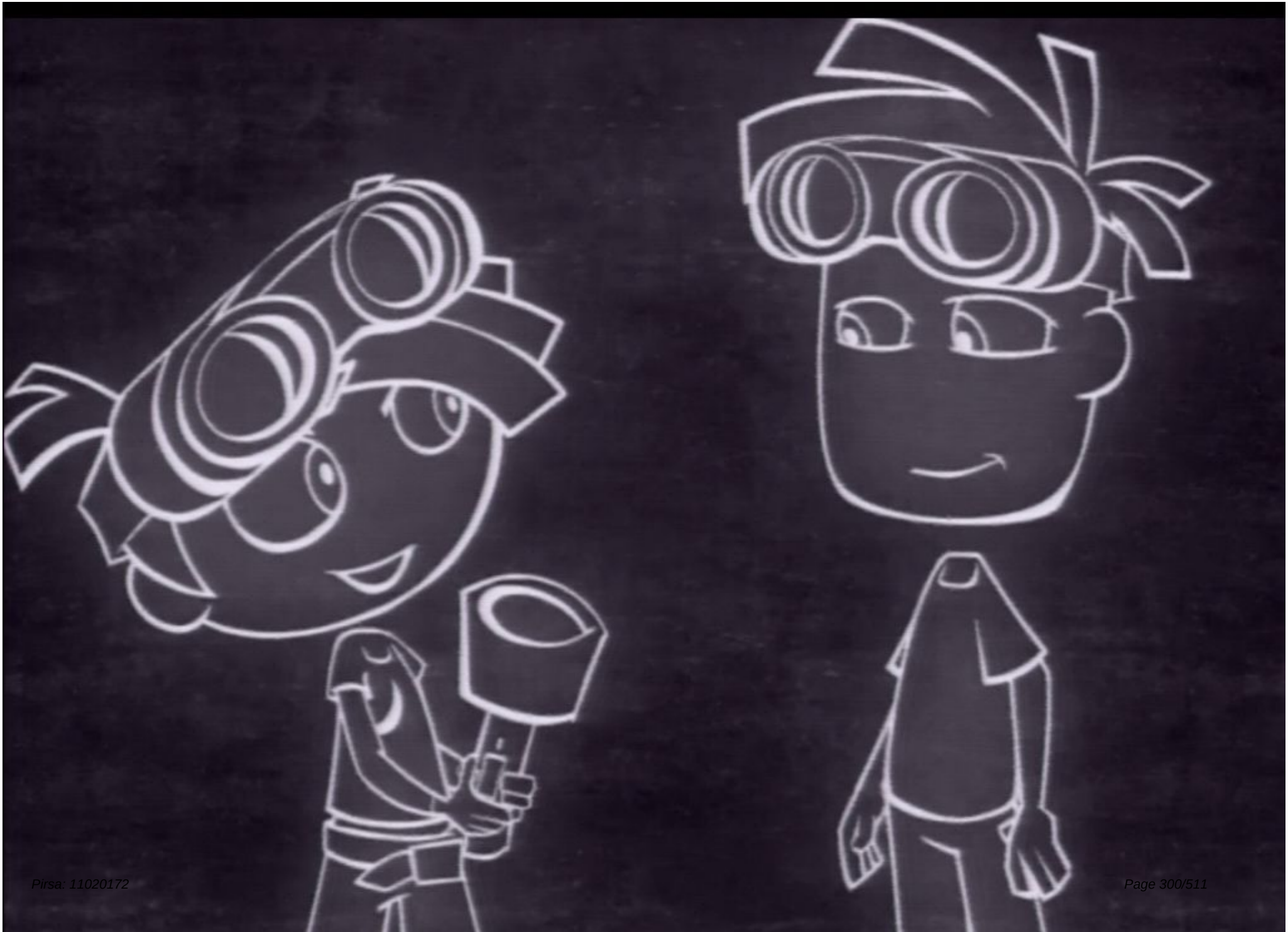

build solar energy technologies


build solar energy technologies

build quantum computers
BRUKER
IQC
Institute for Quantum Computing







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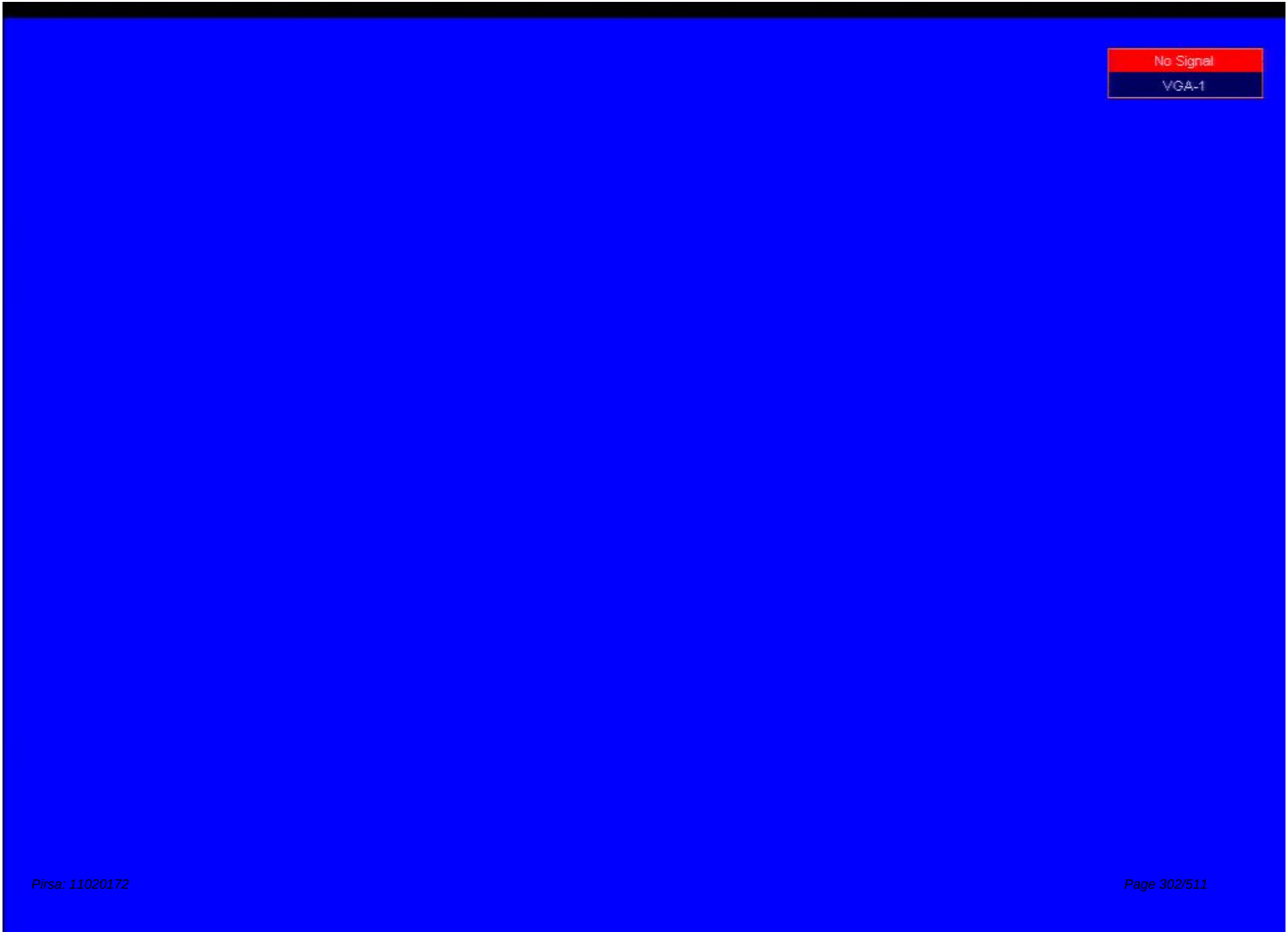
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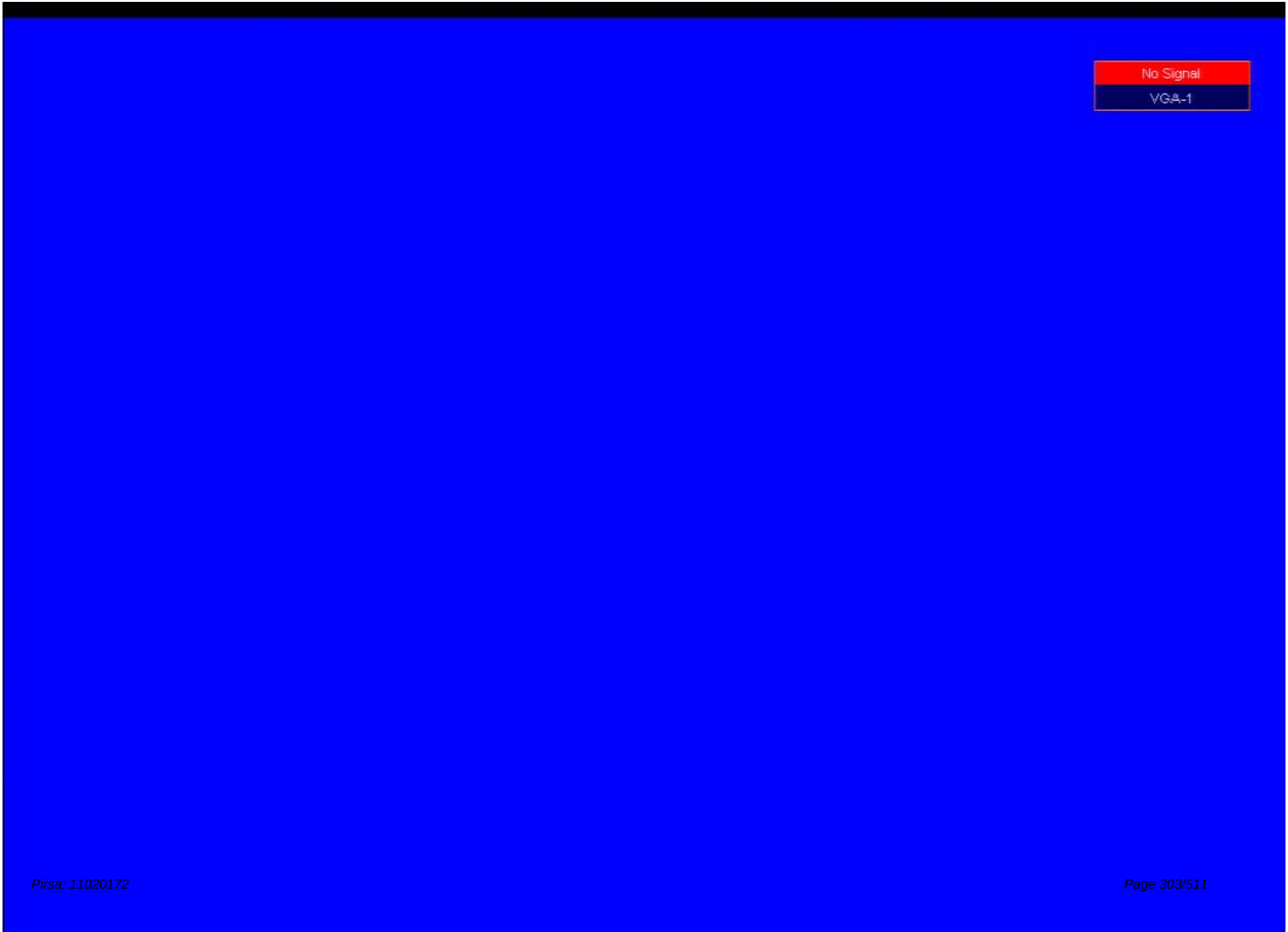
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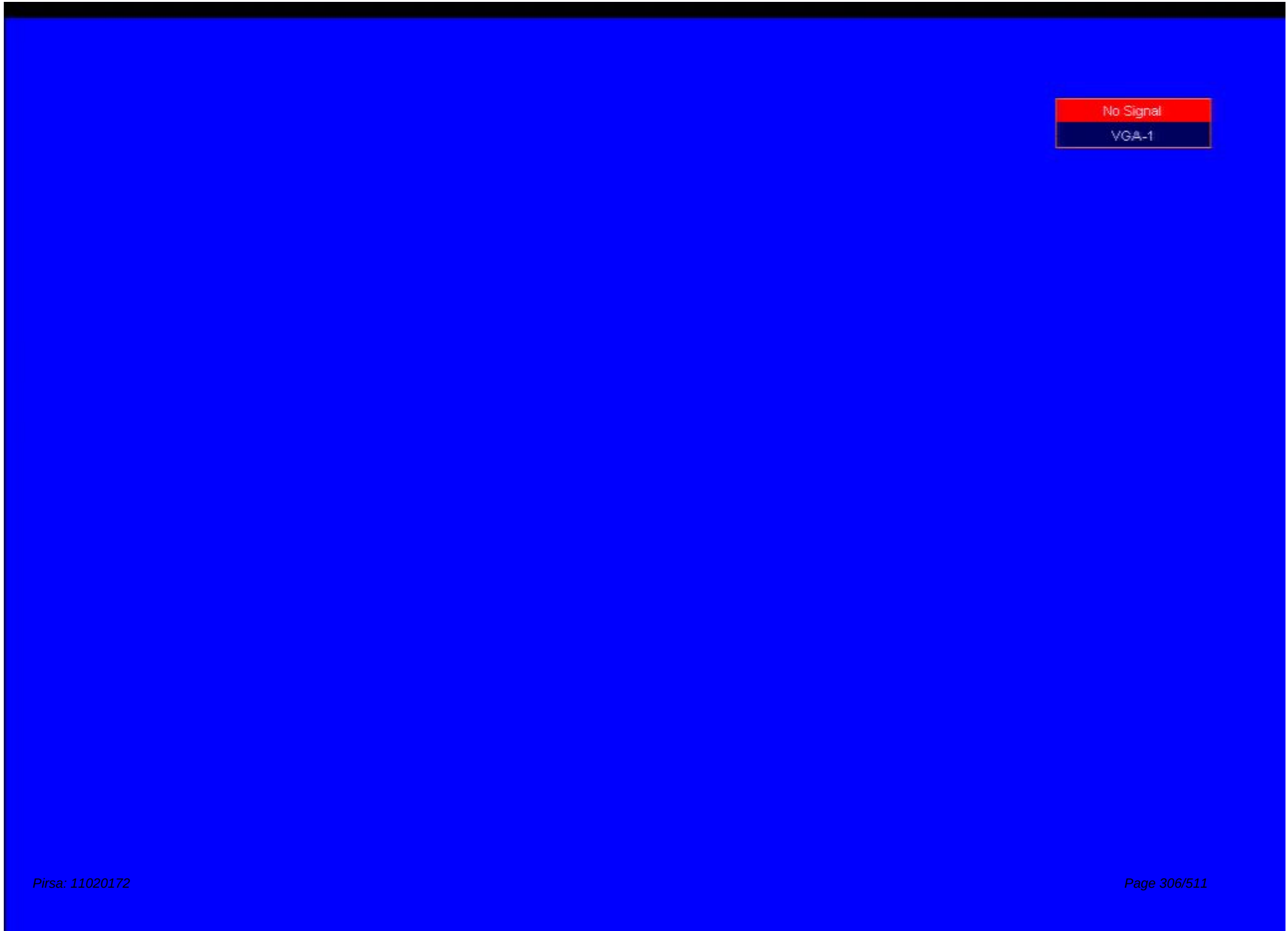
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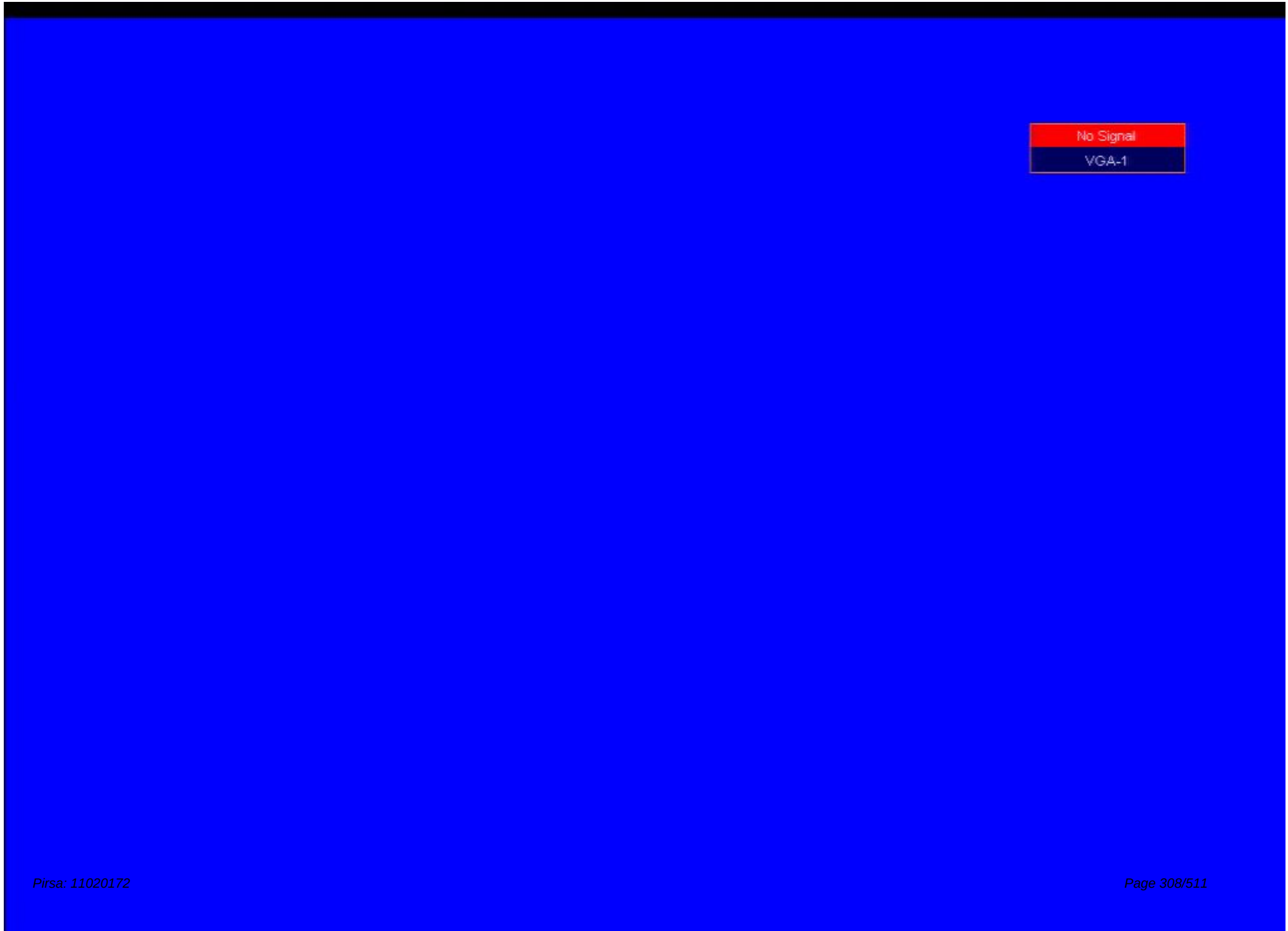
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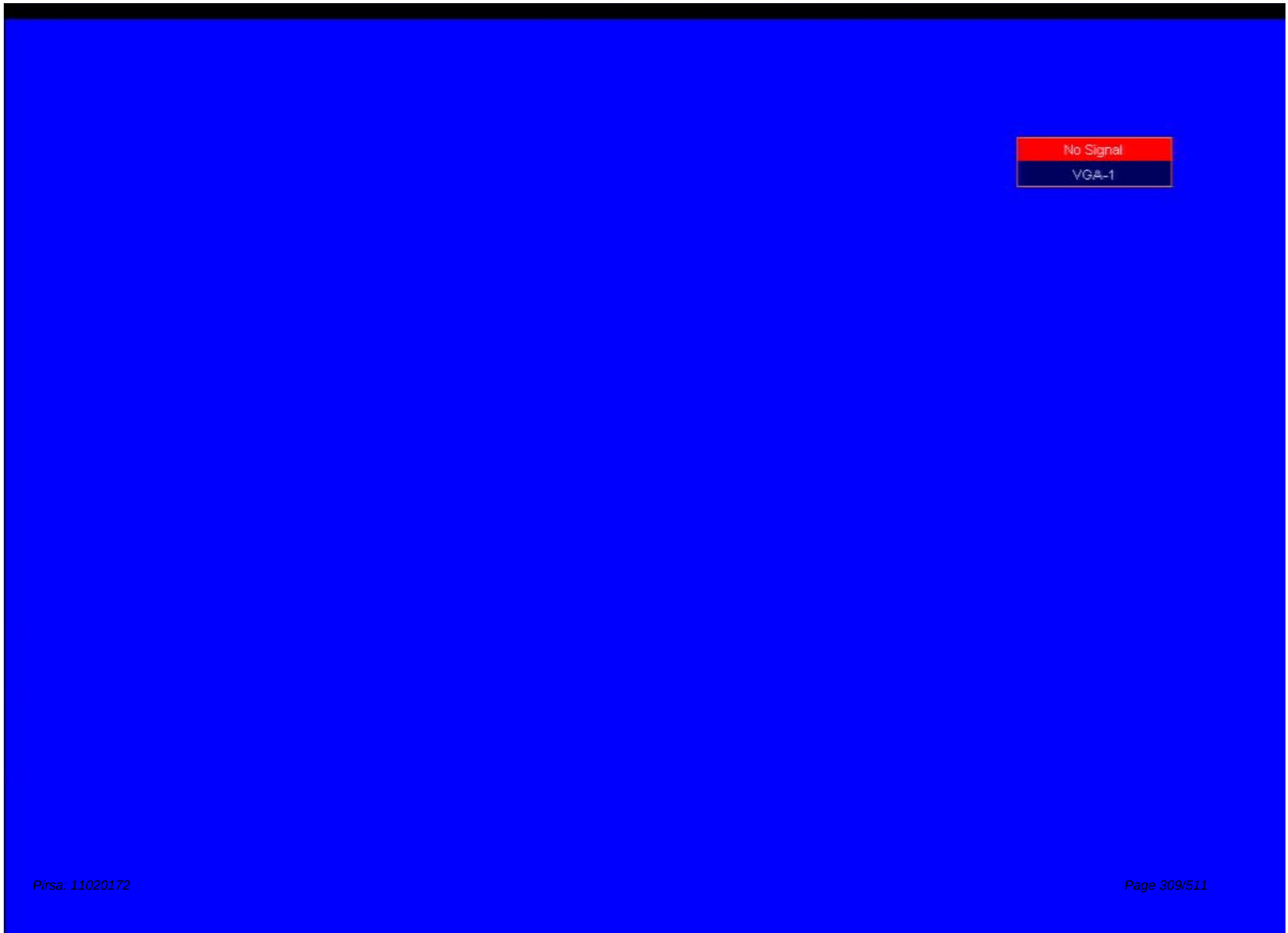
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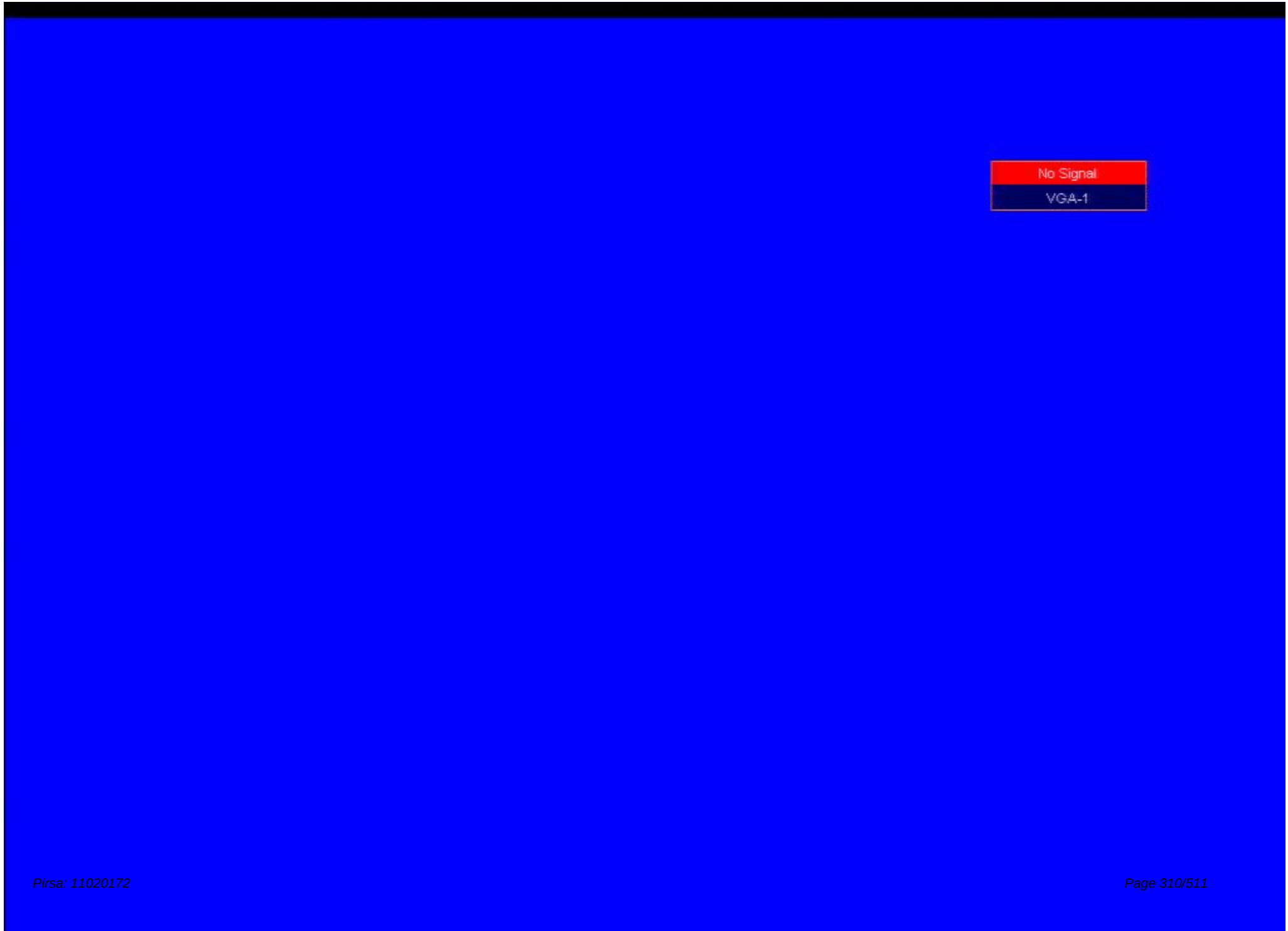
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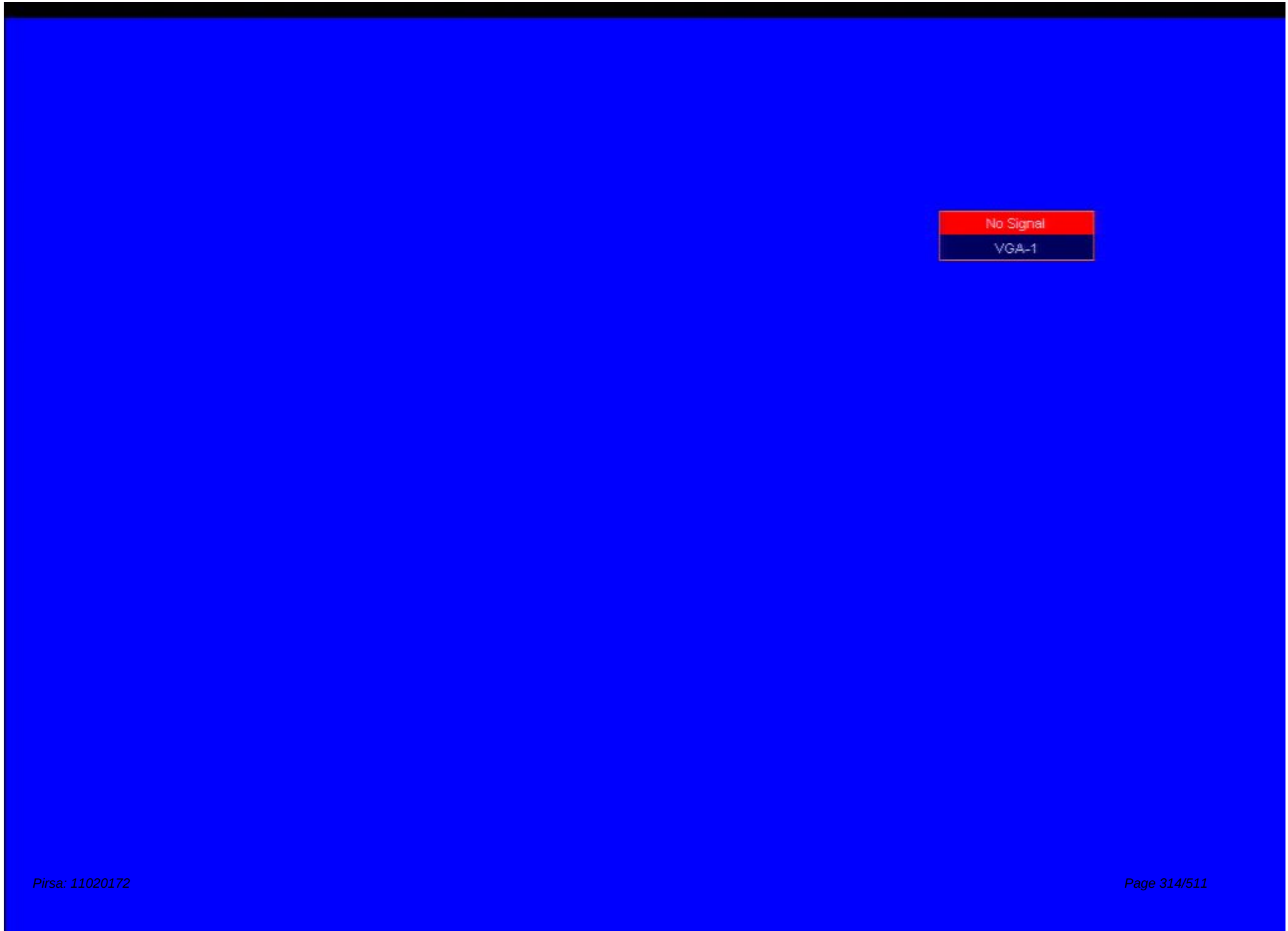
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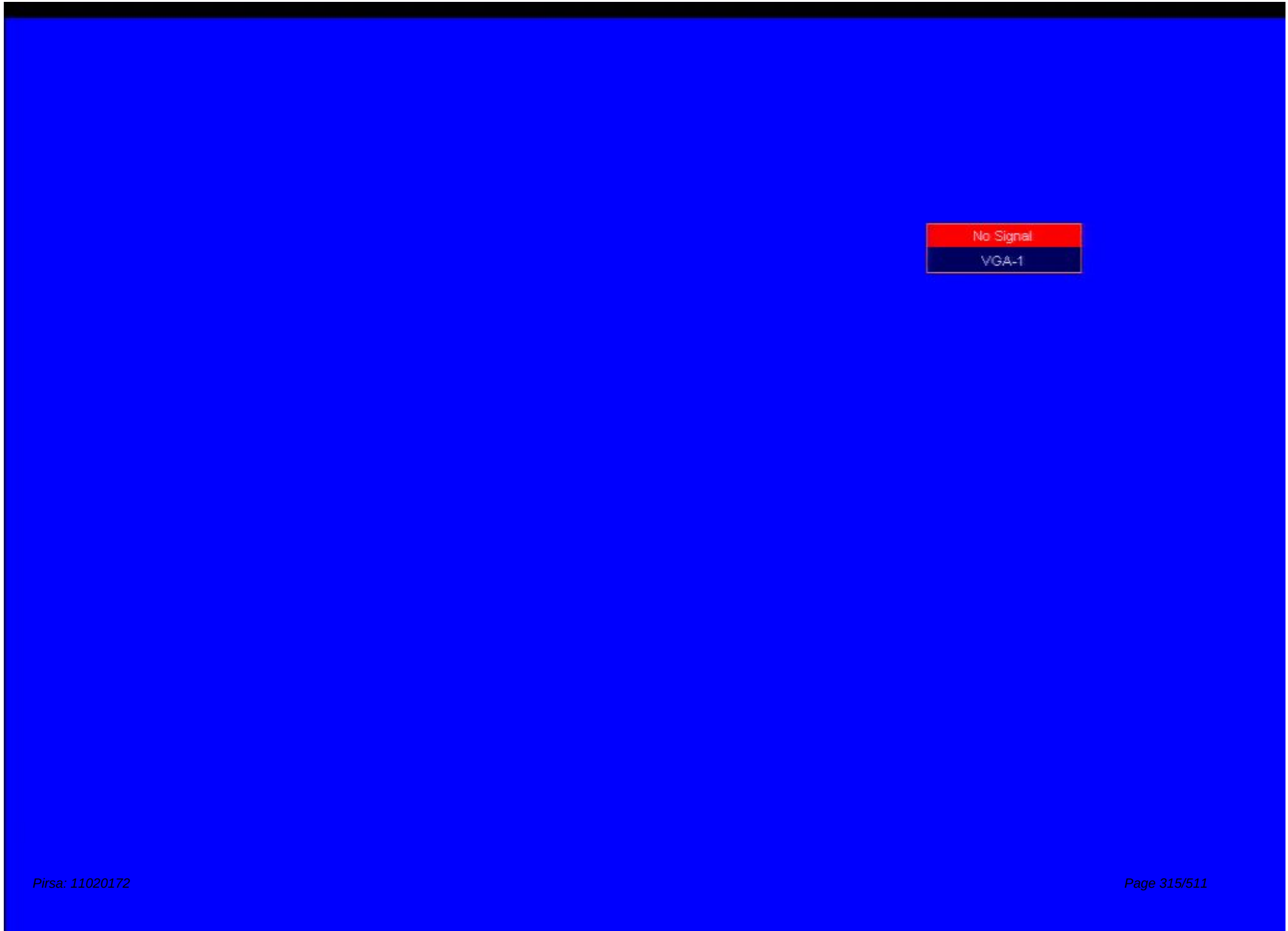
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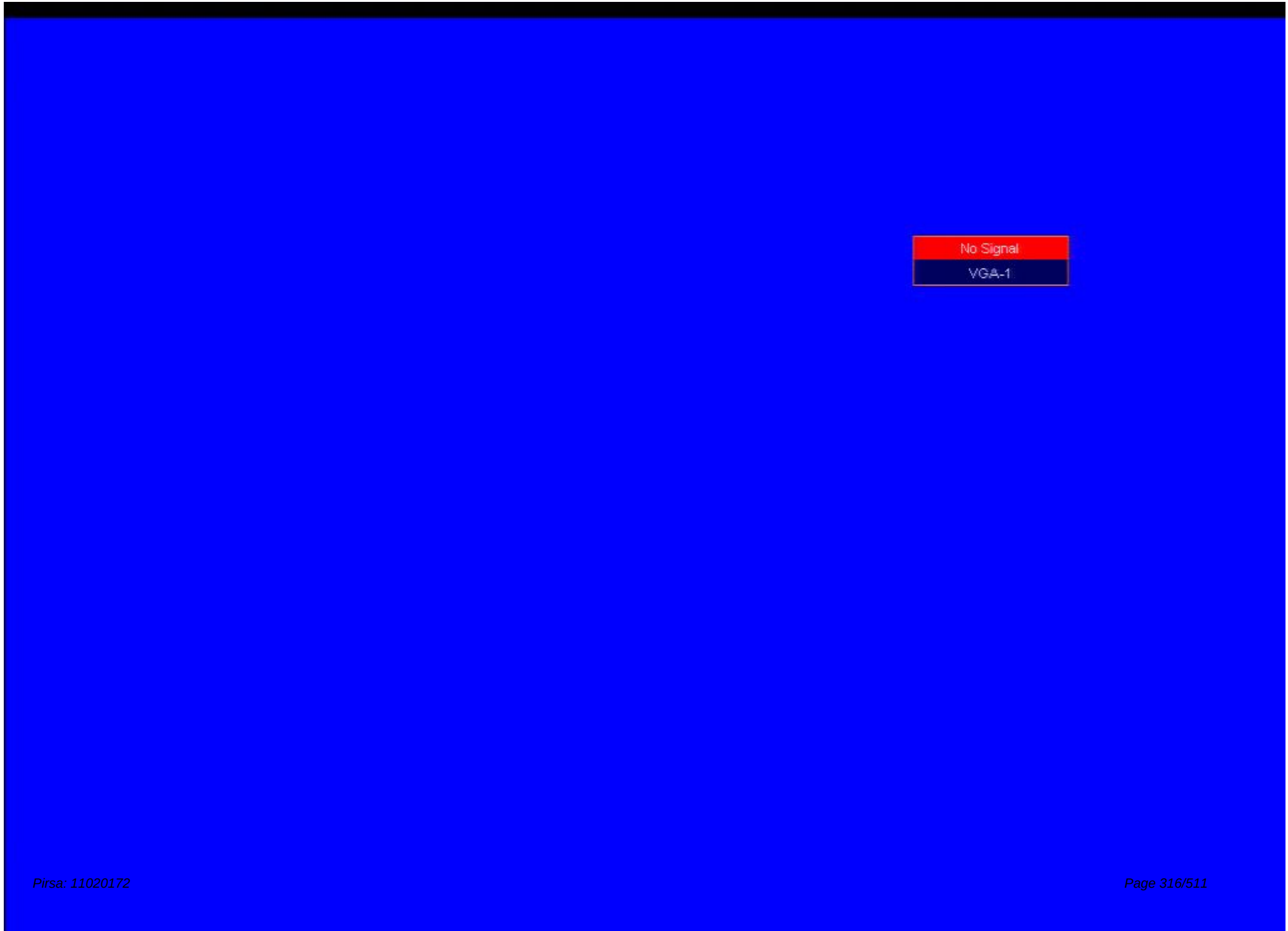
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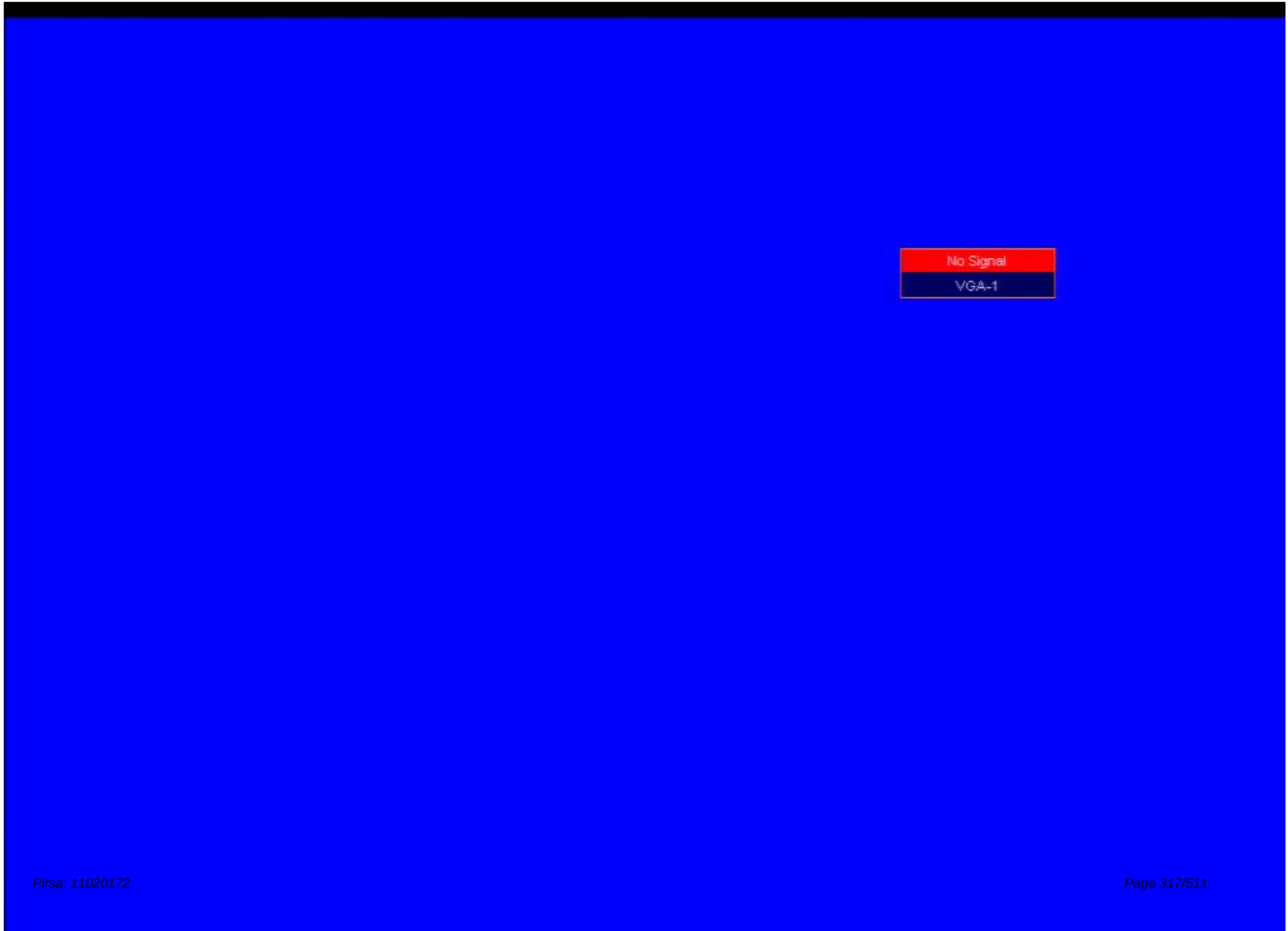
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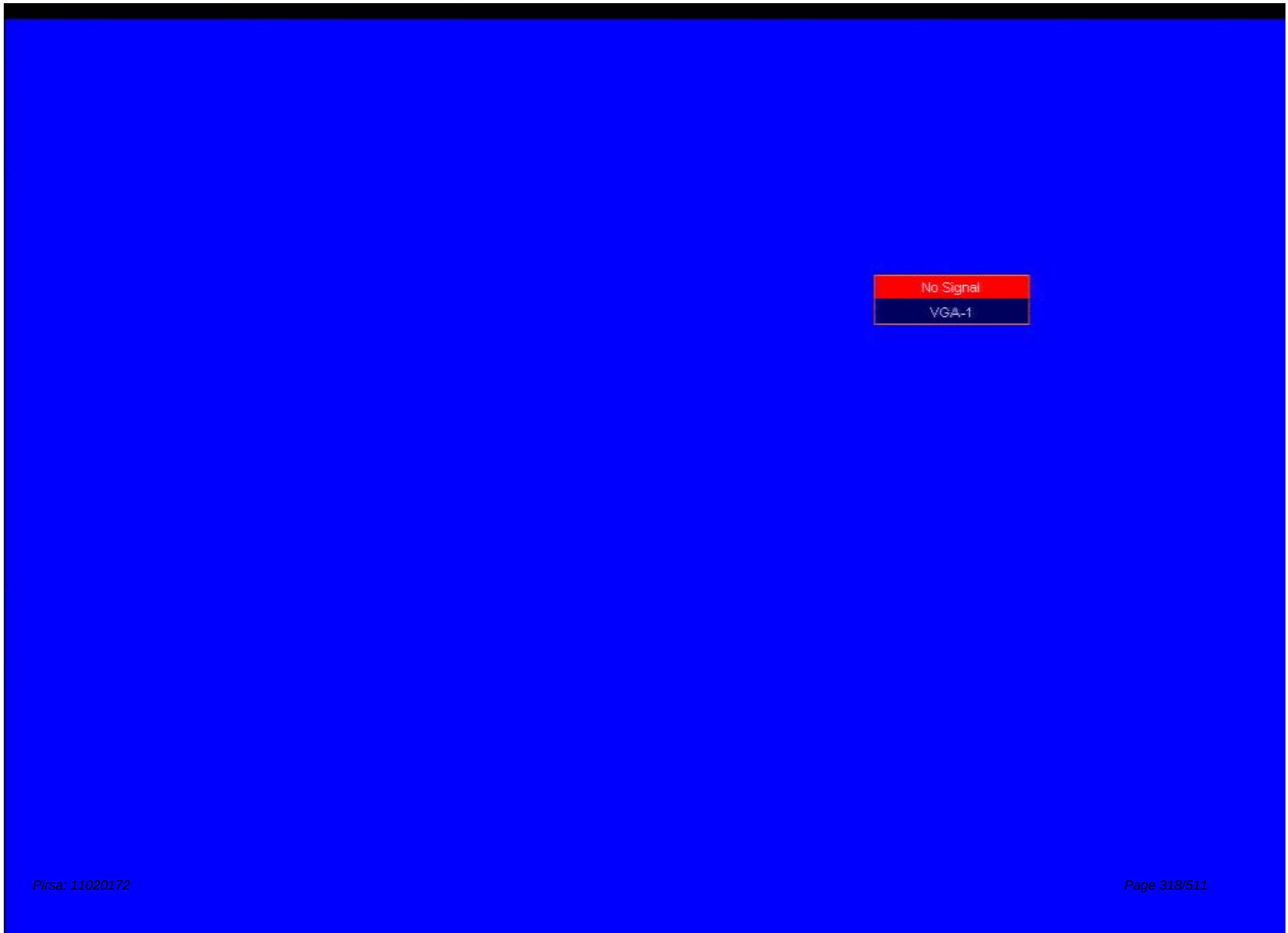
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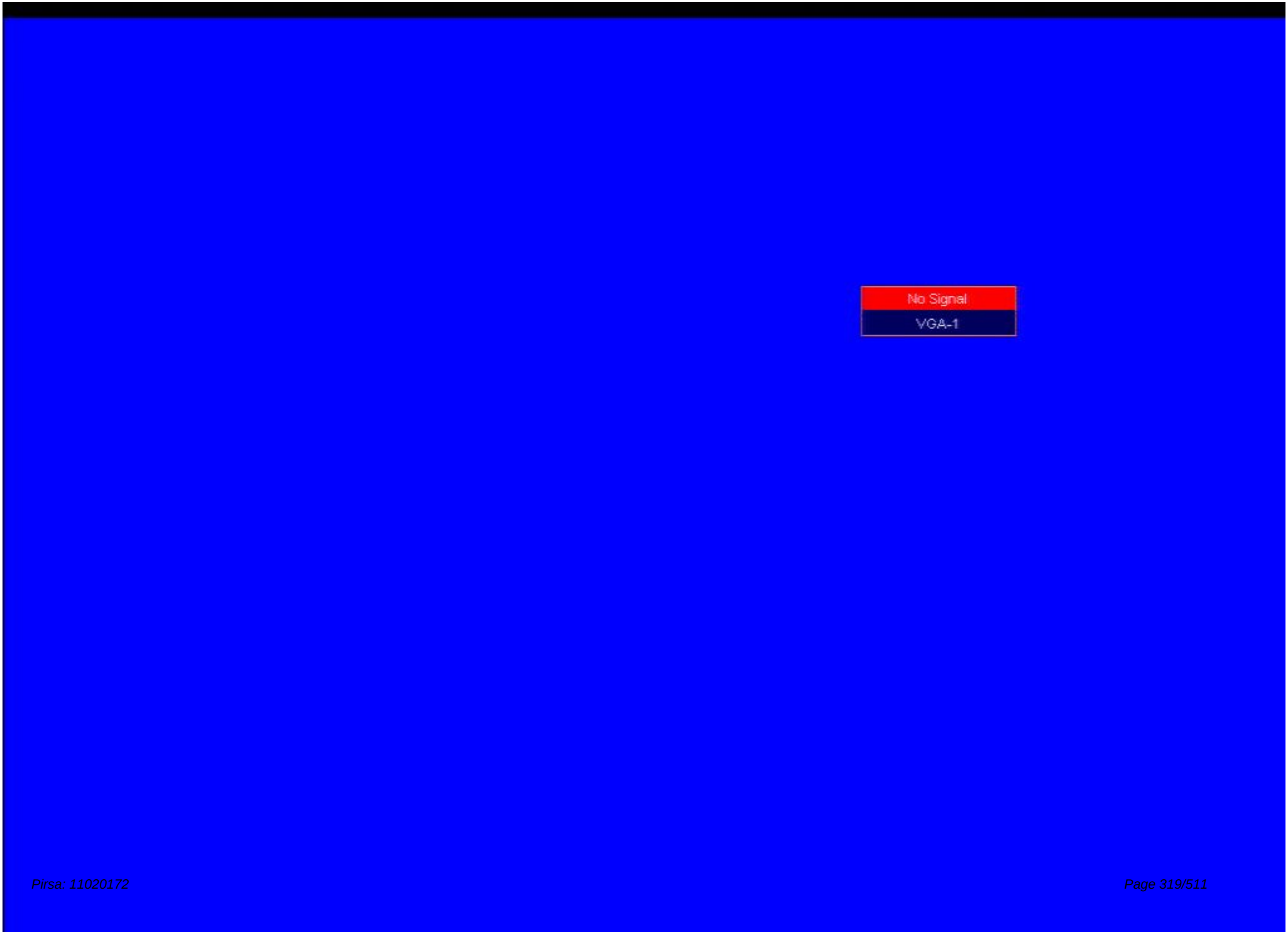
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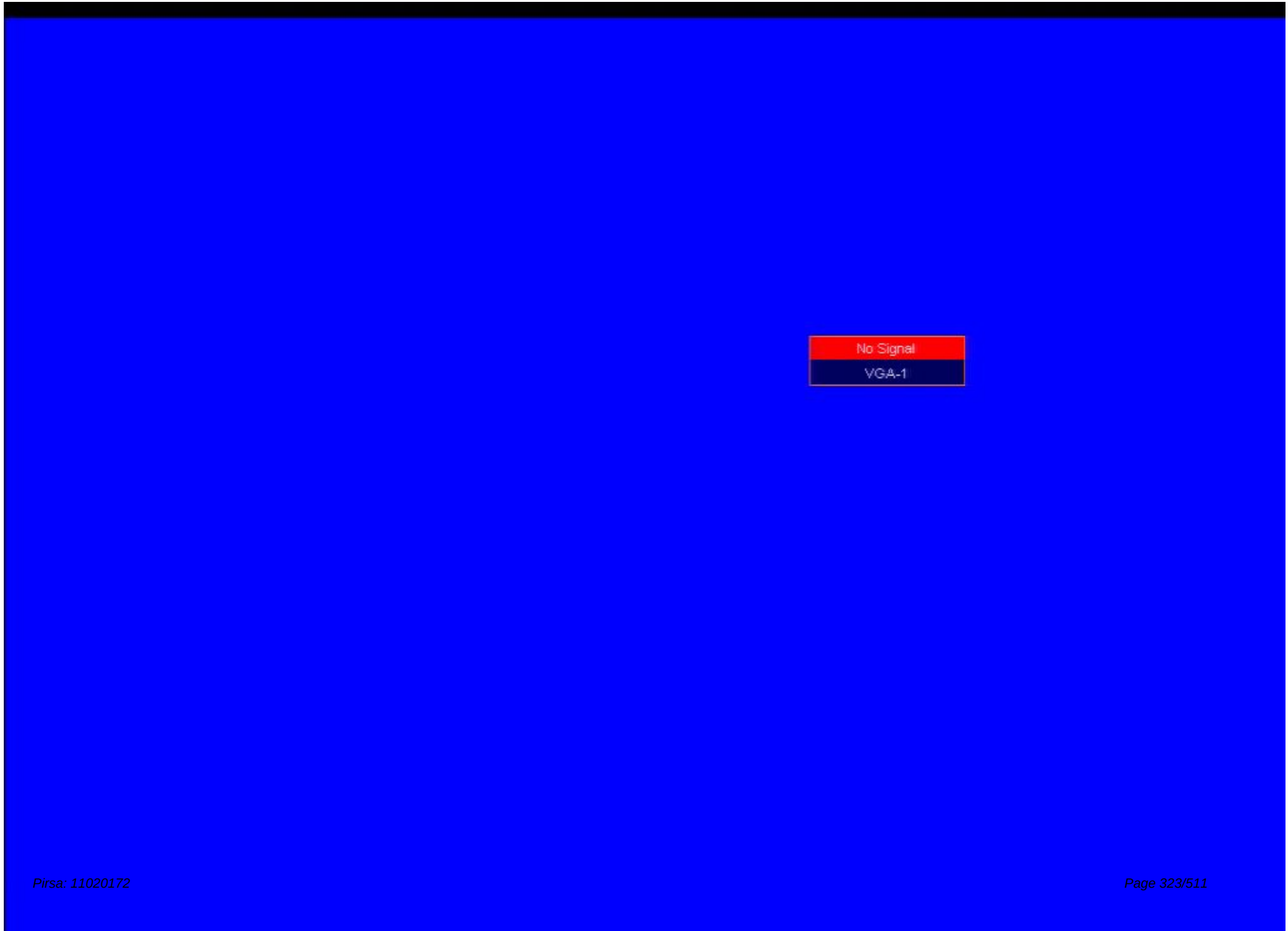
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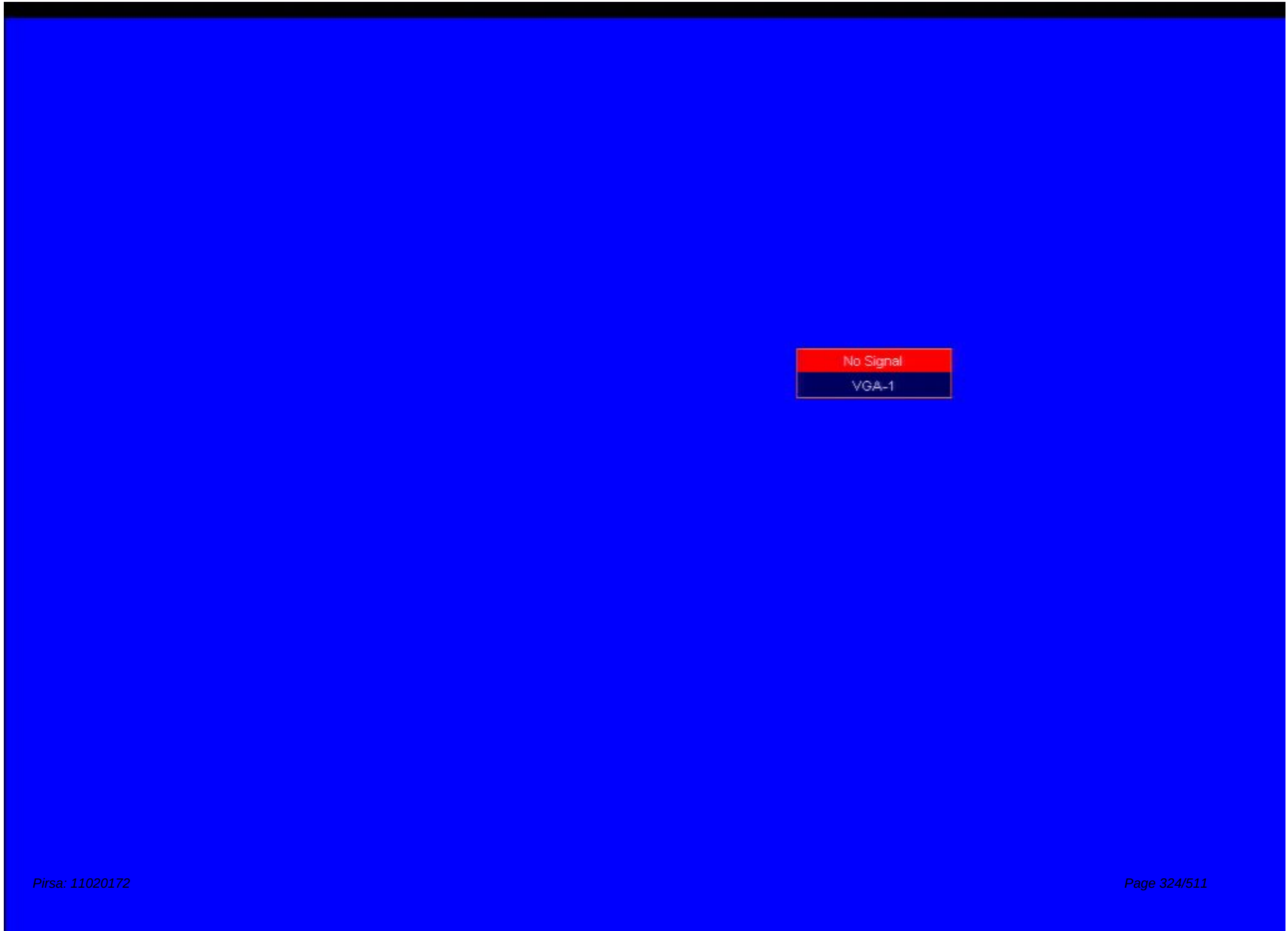
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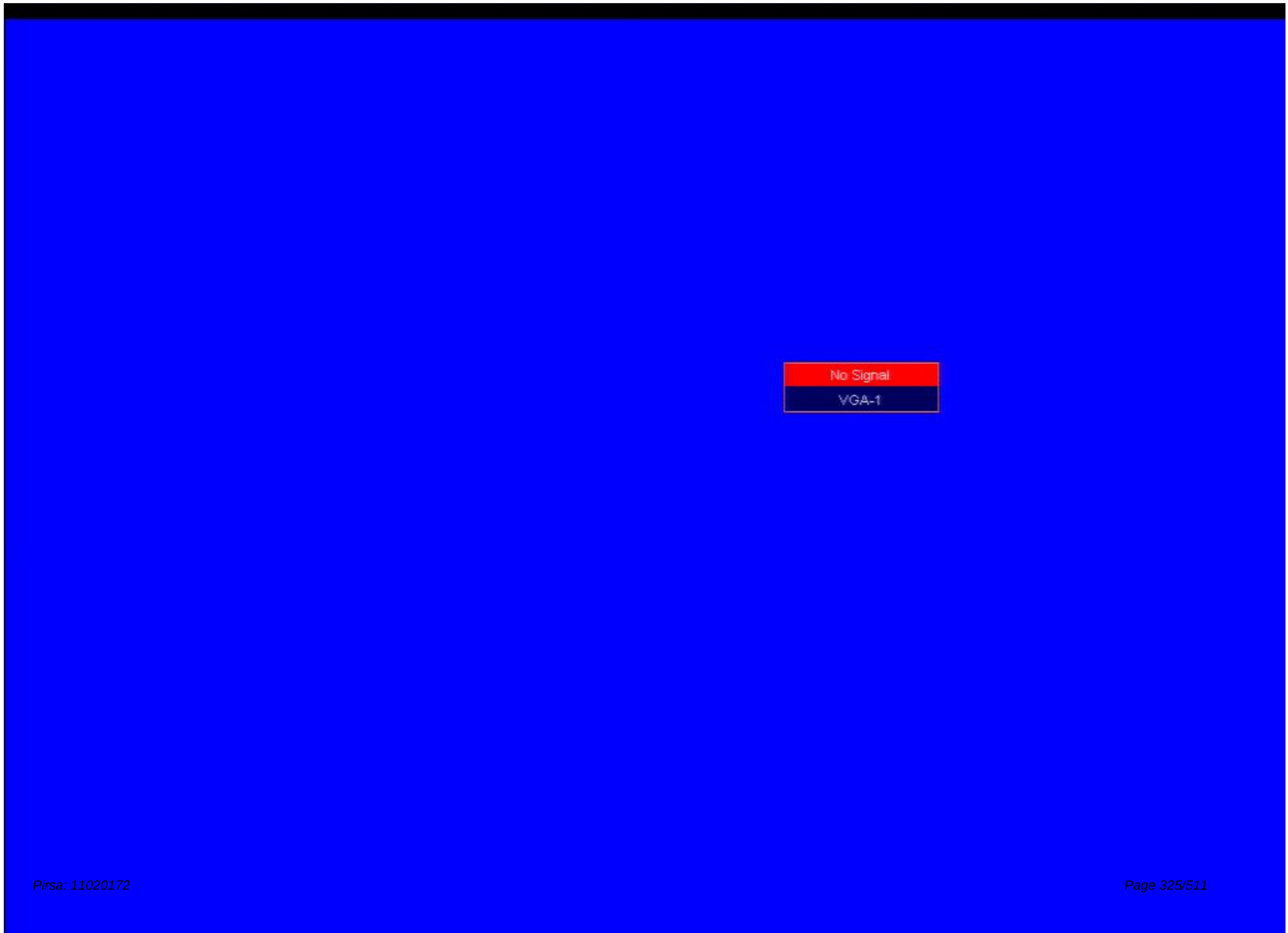
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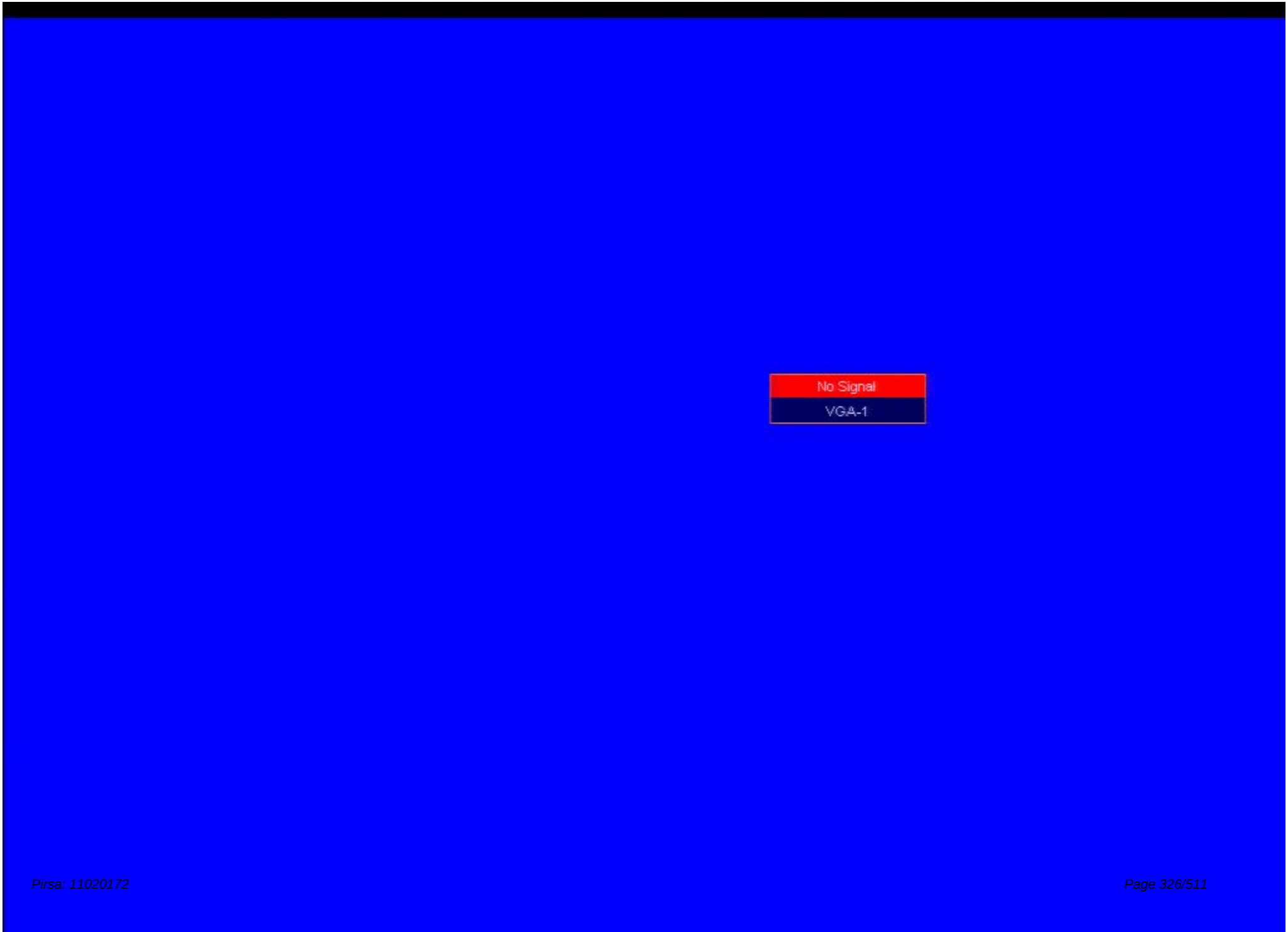
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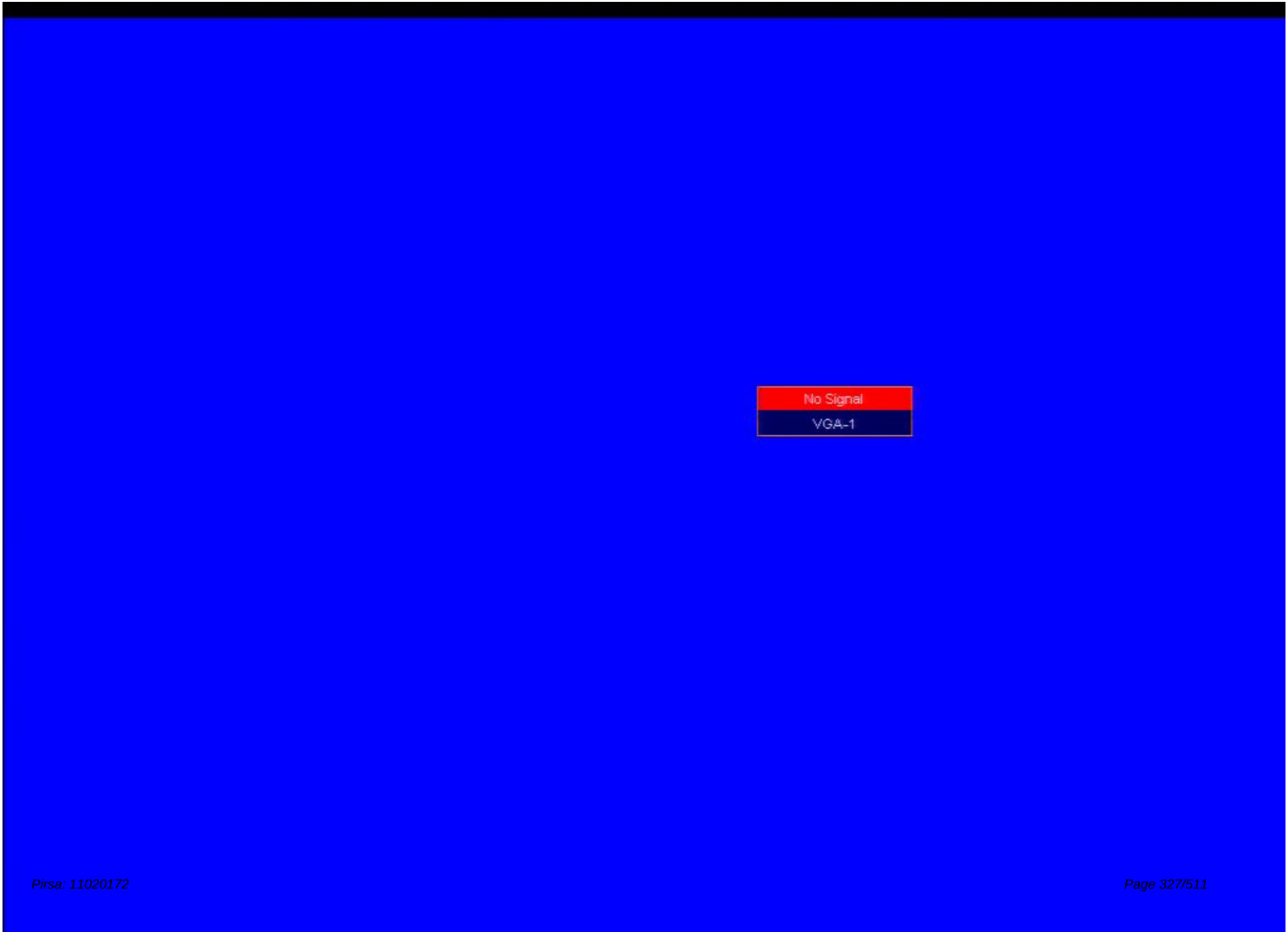
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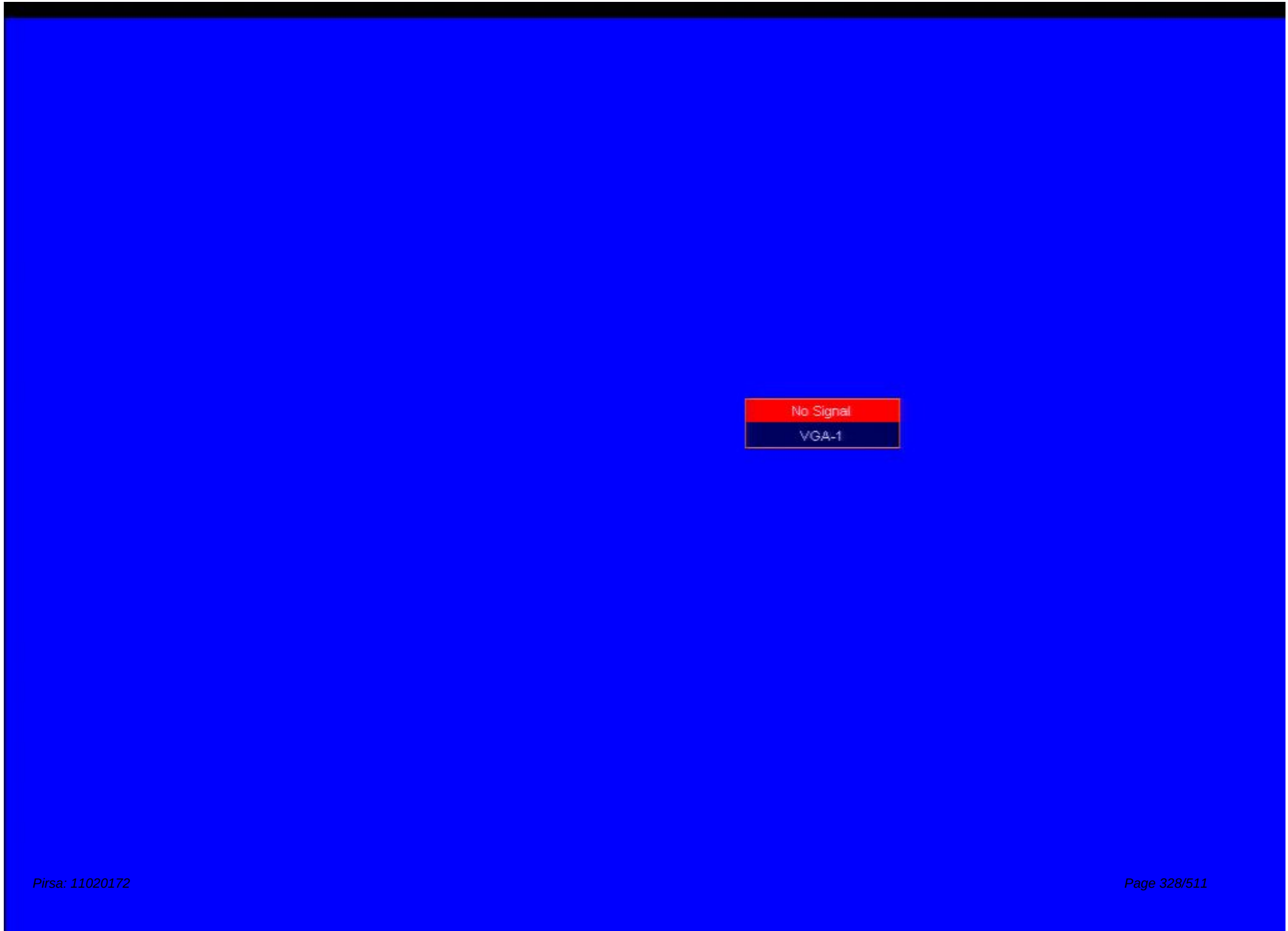
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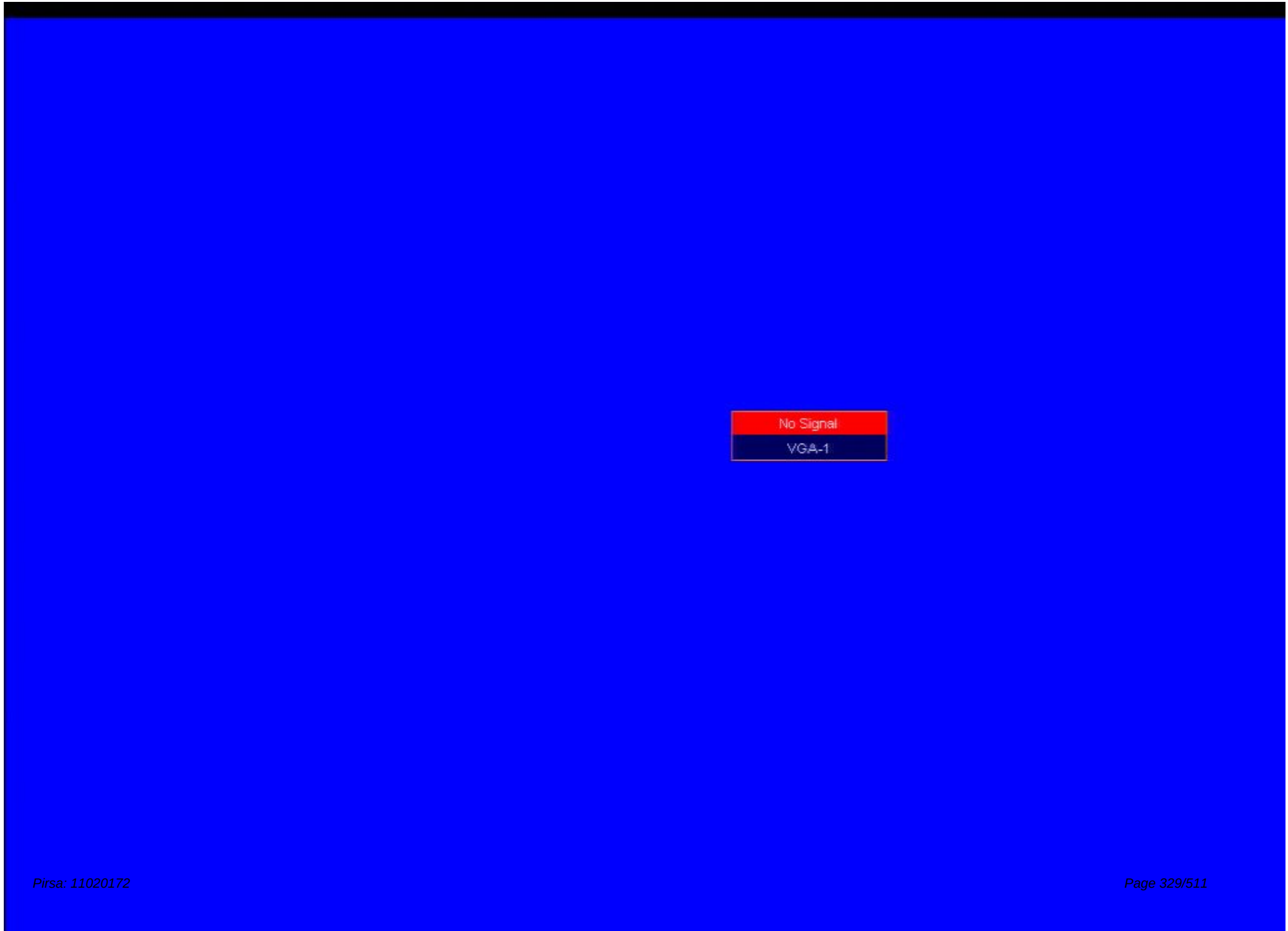
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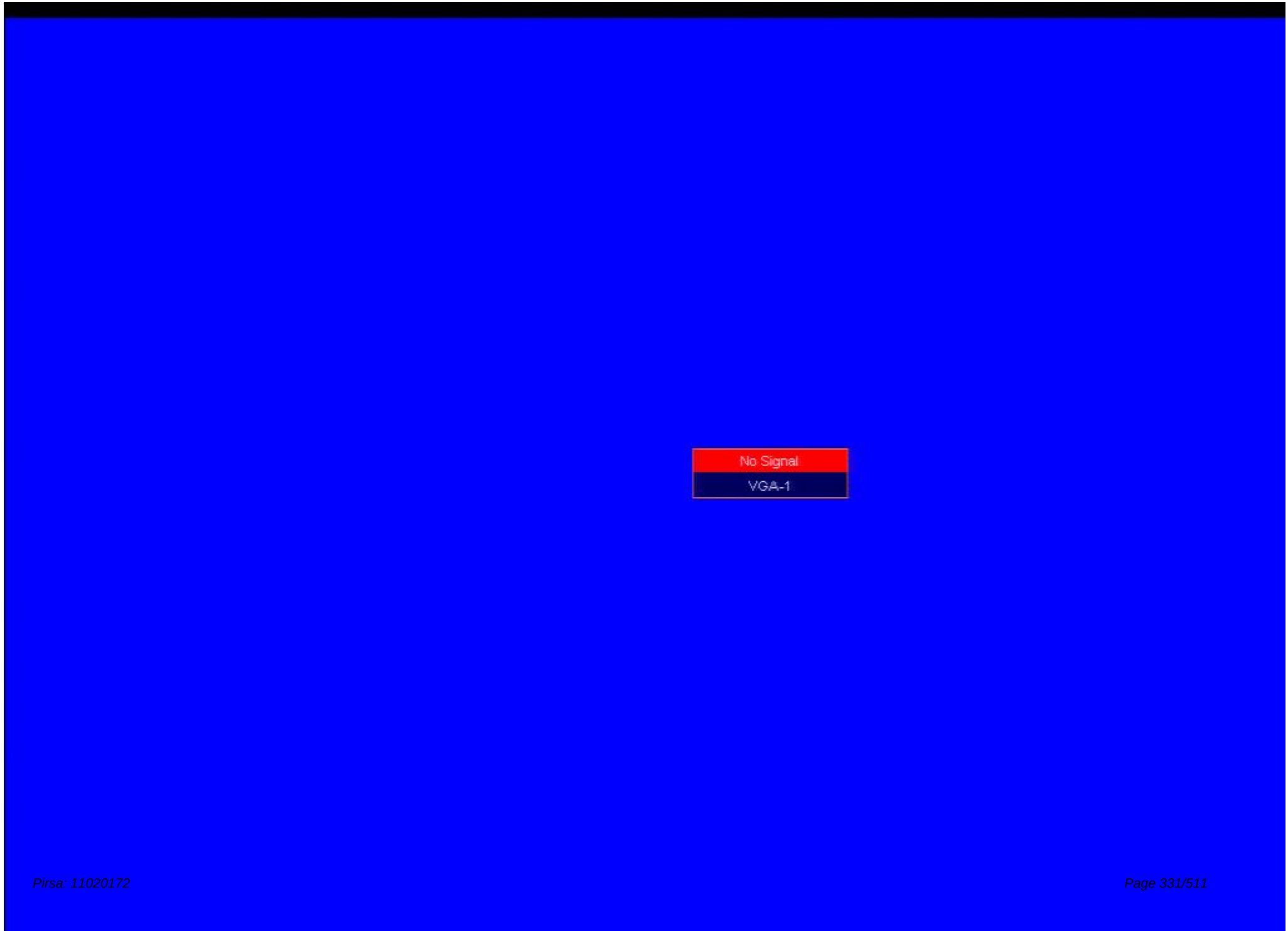
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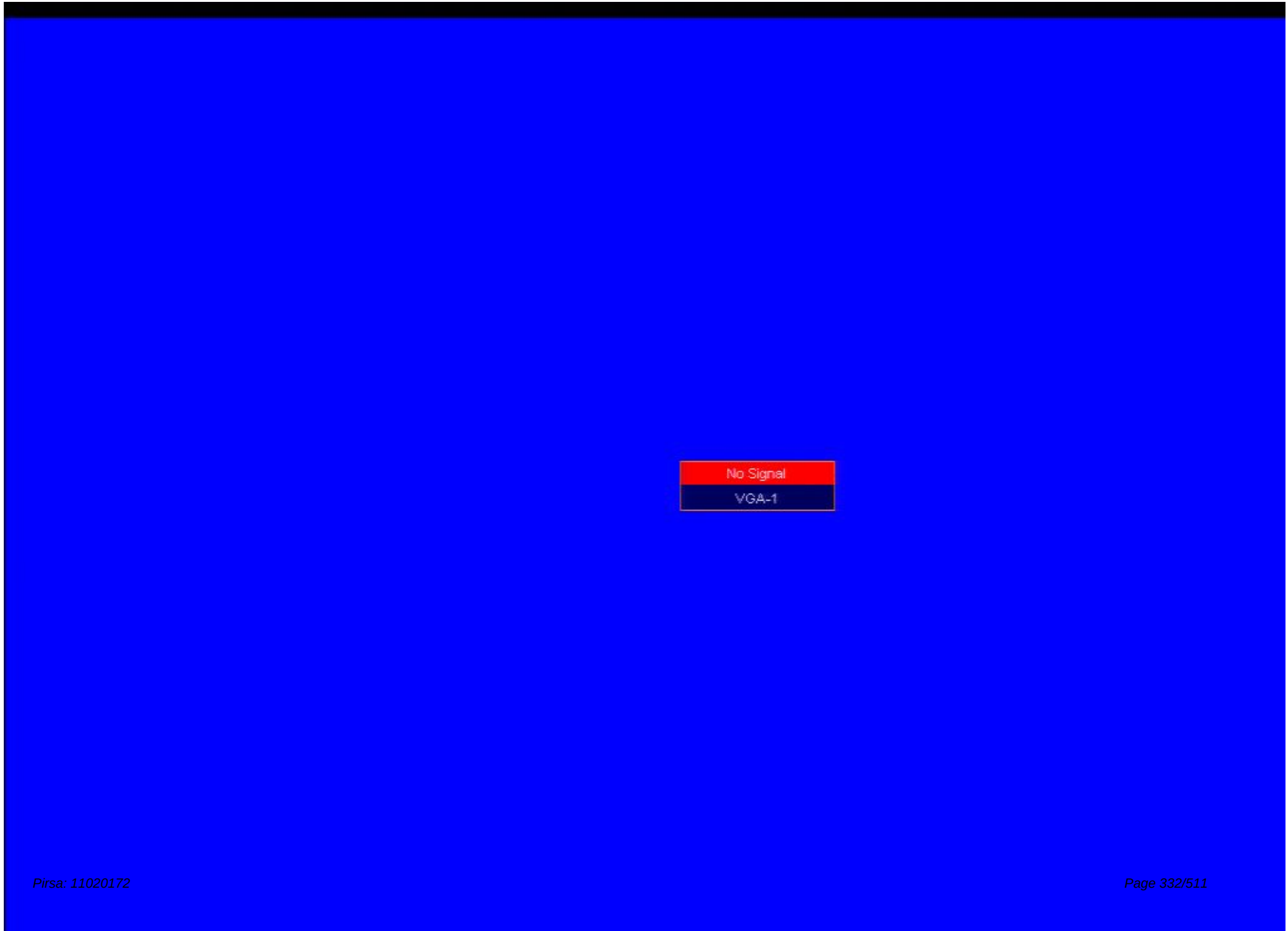
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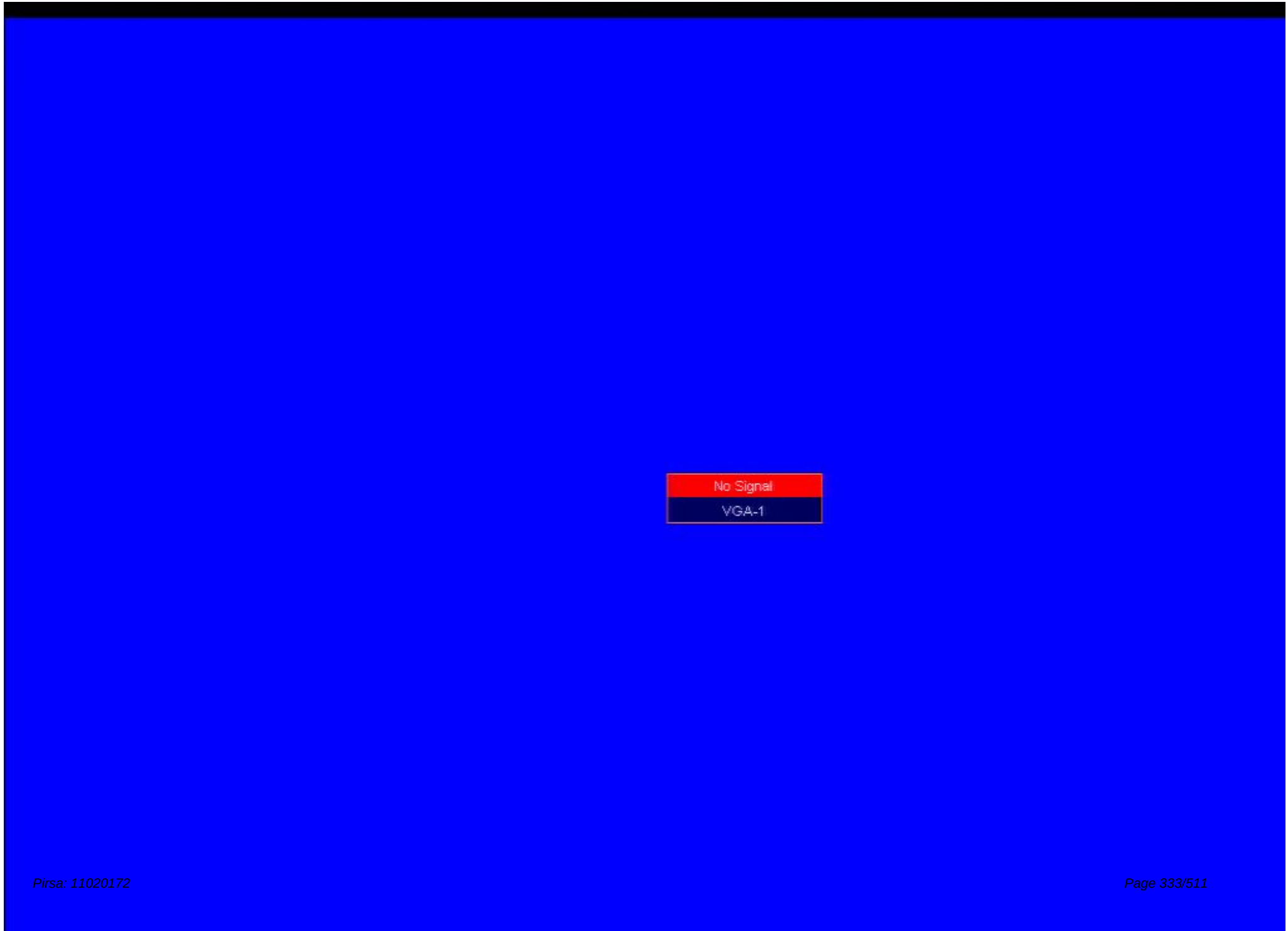
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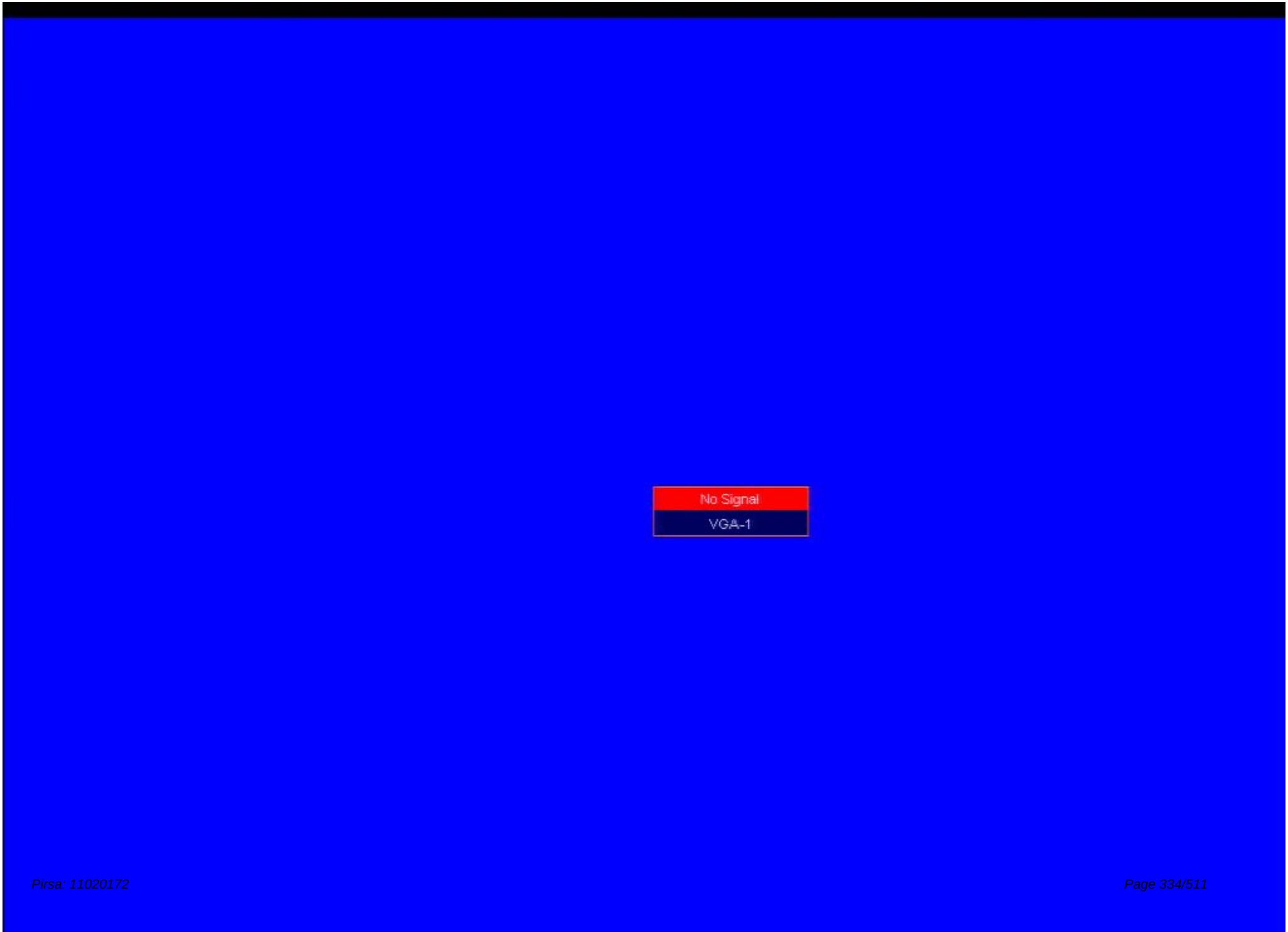
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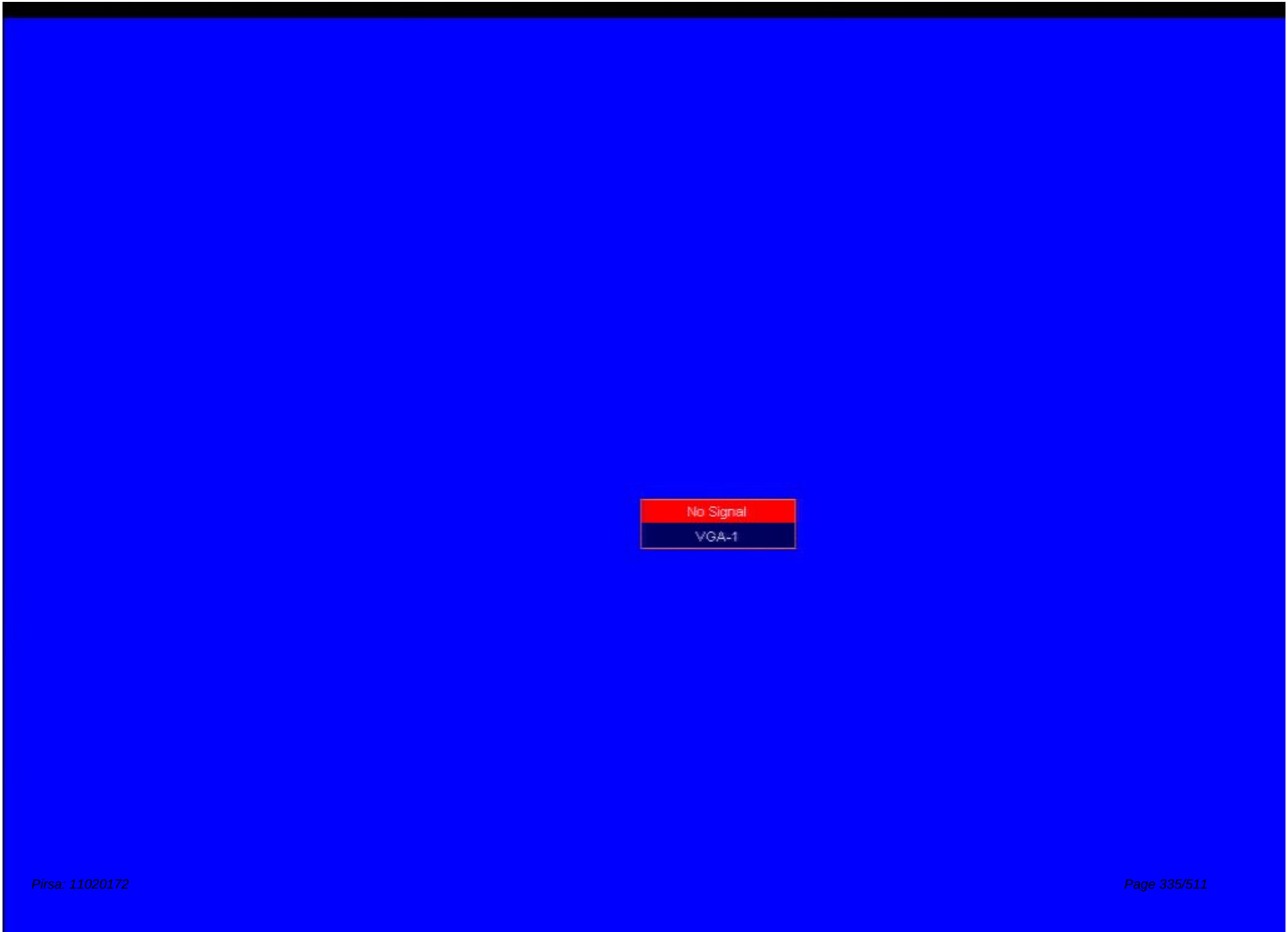
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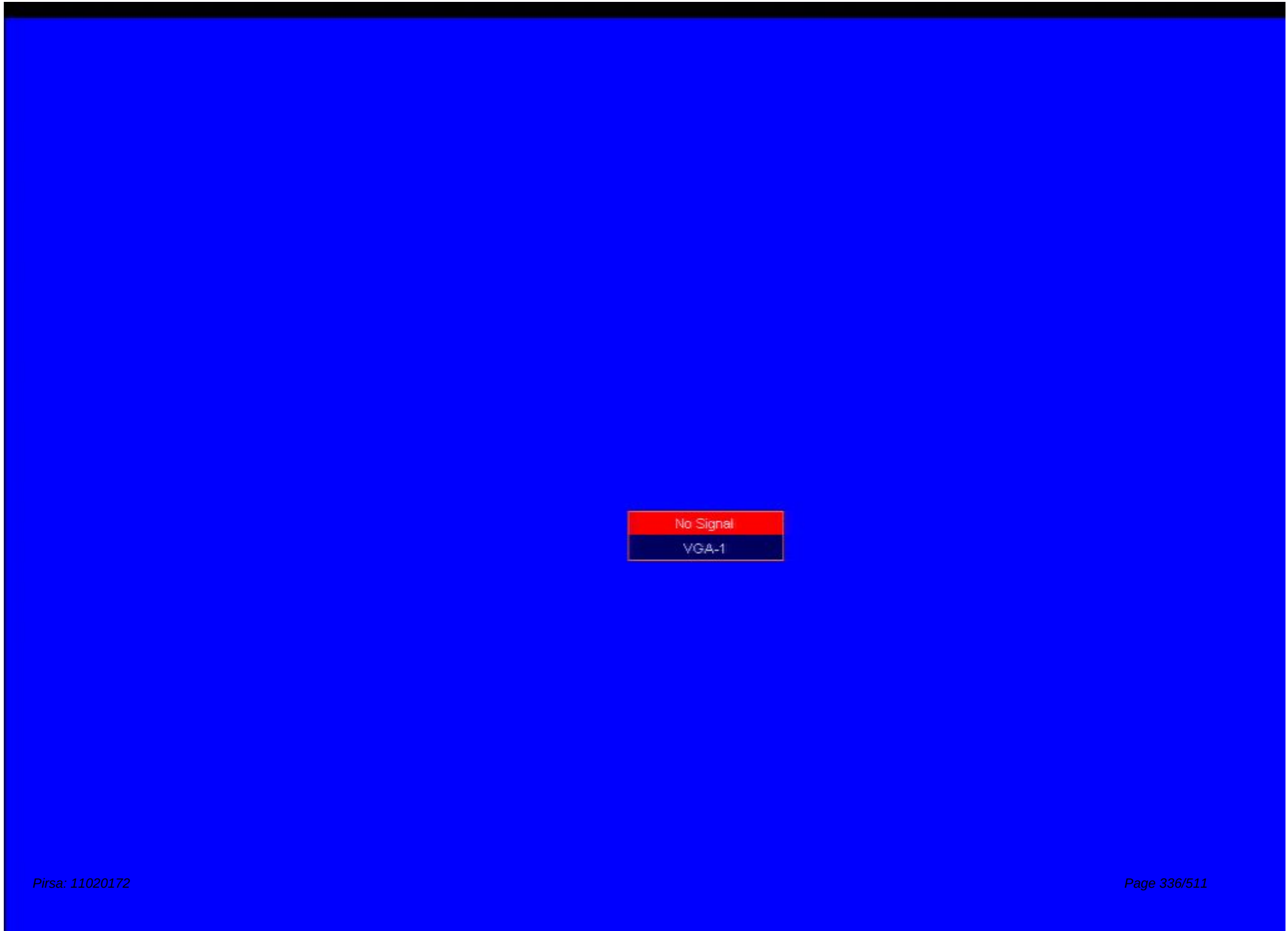
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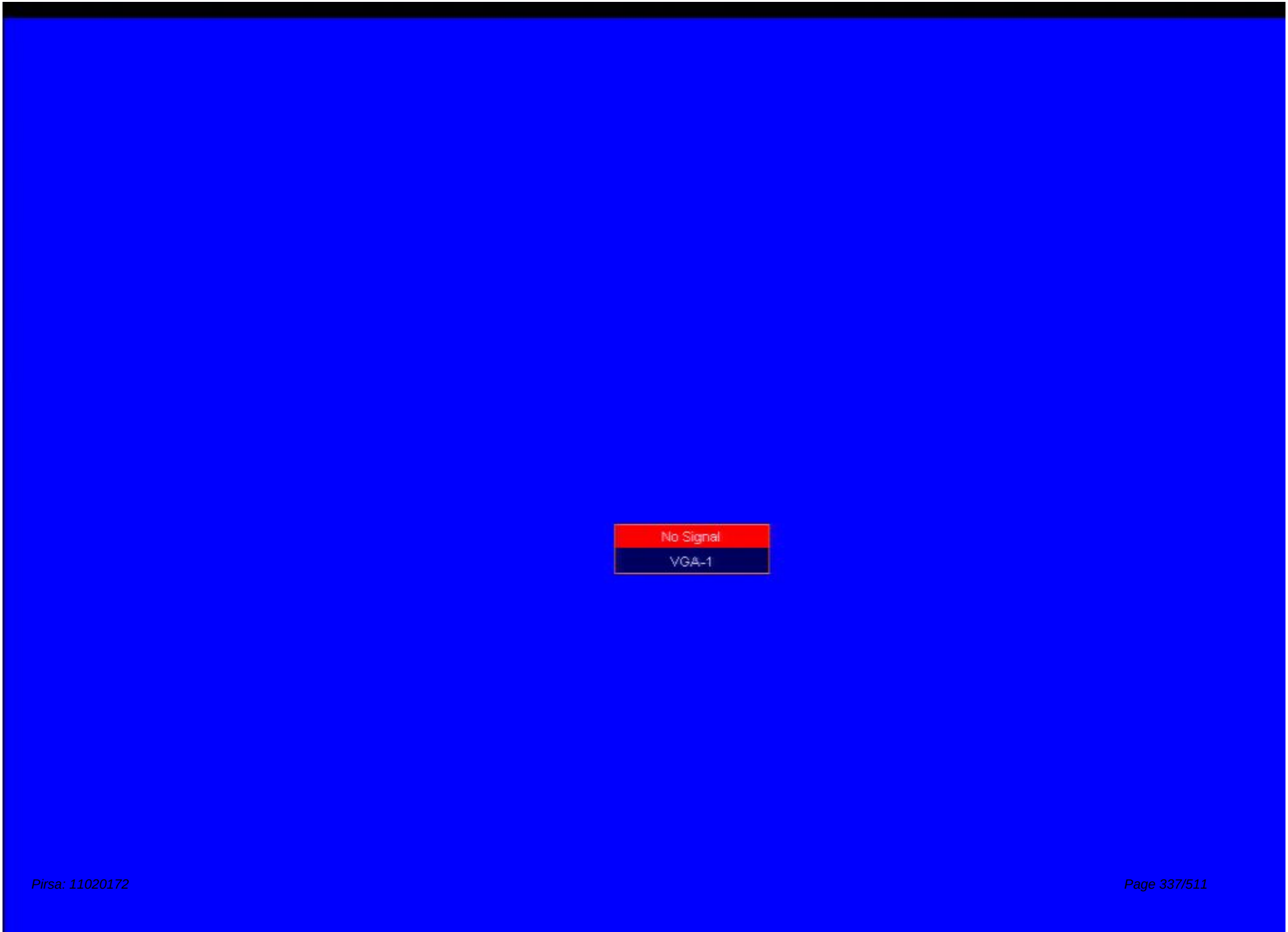
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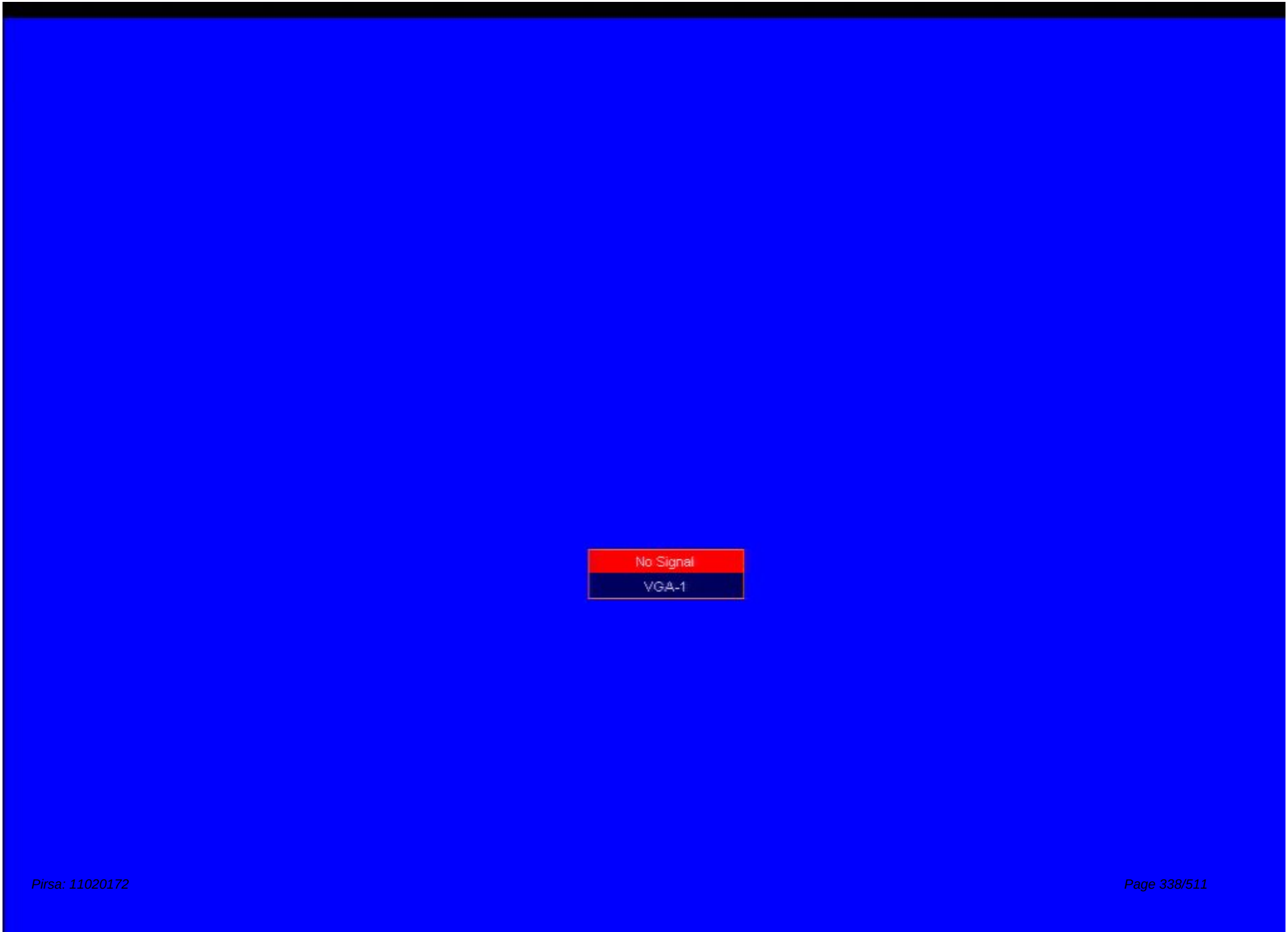
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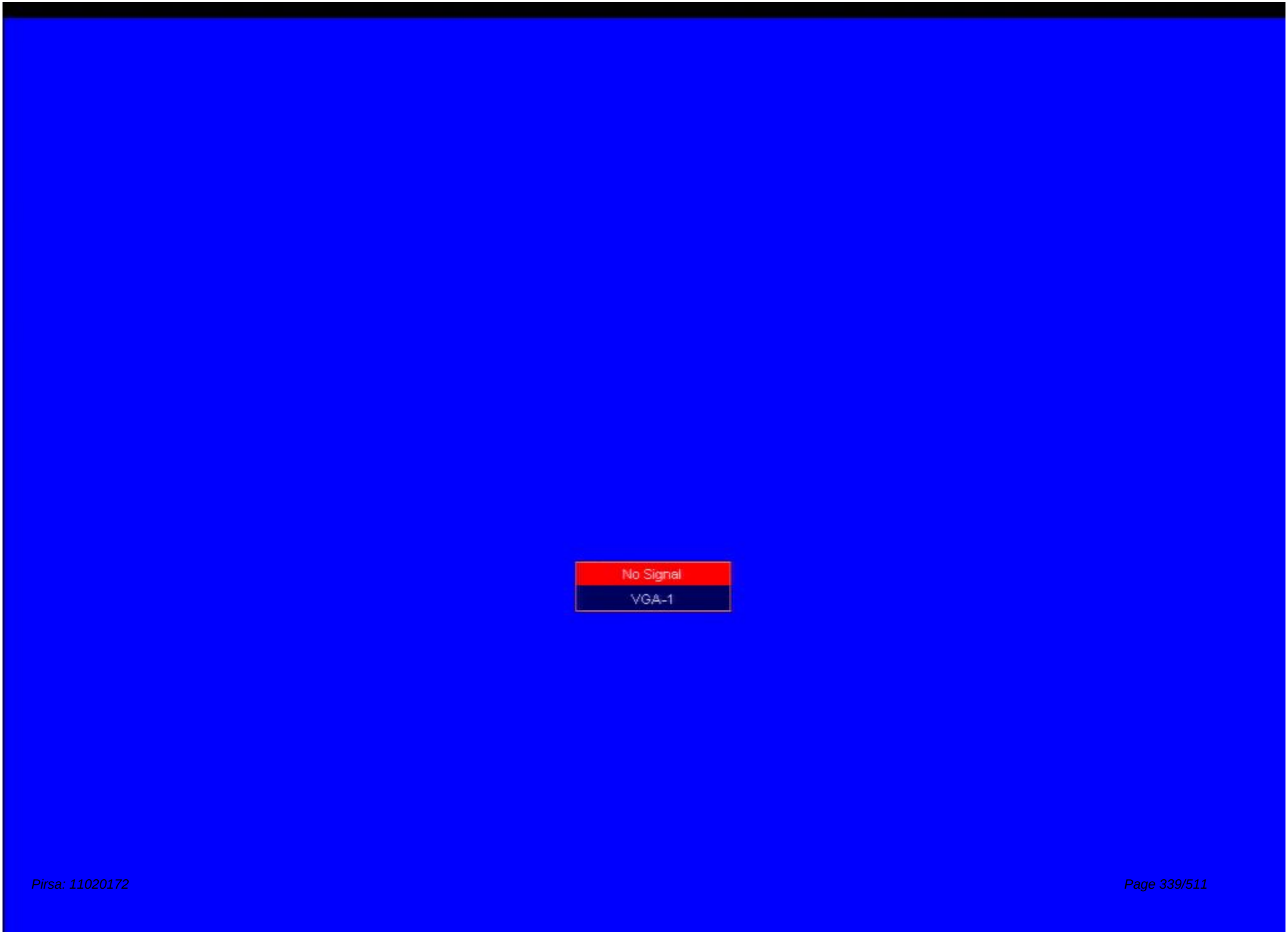
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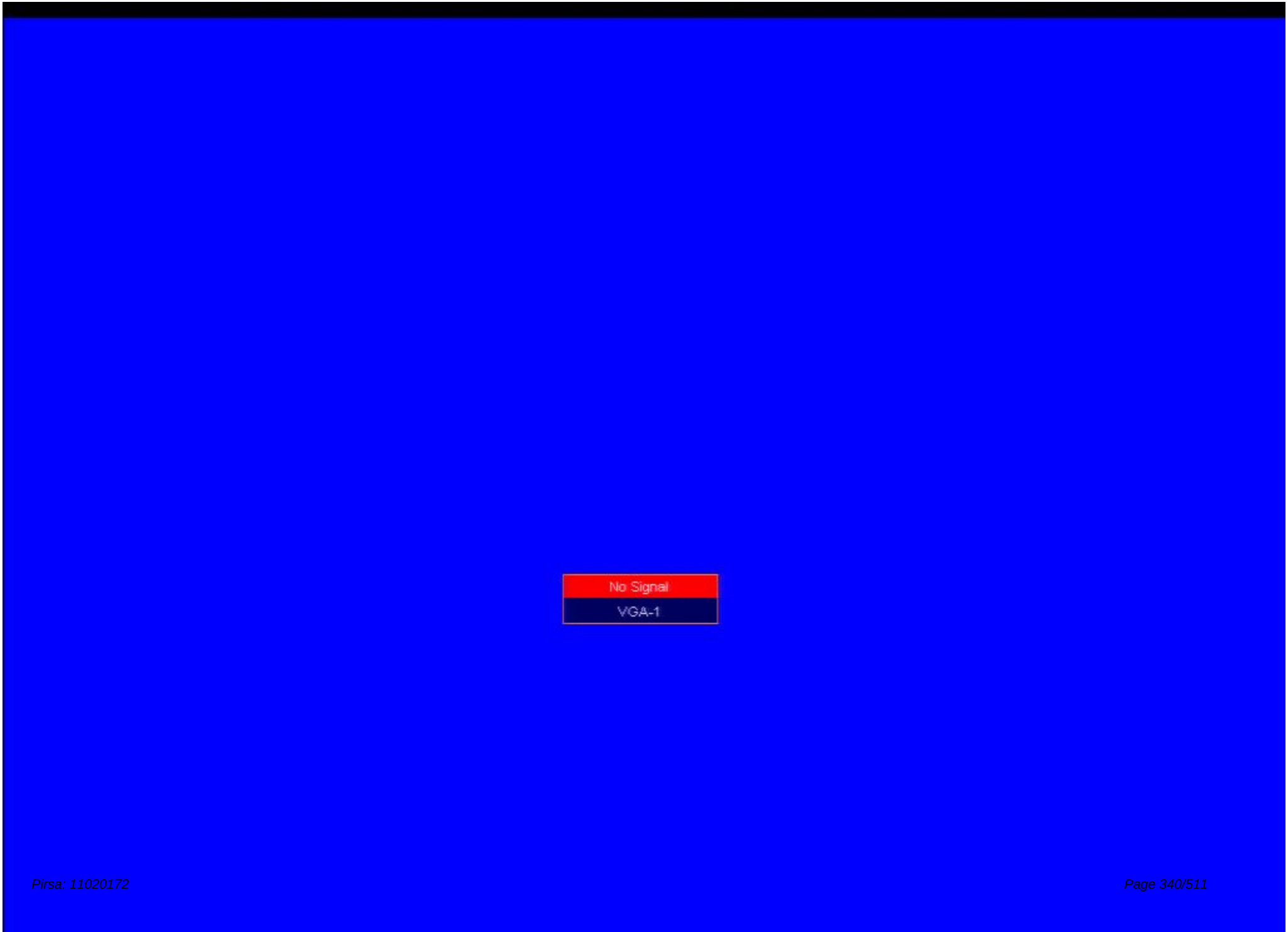
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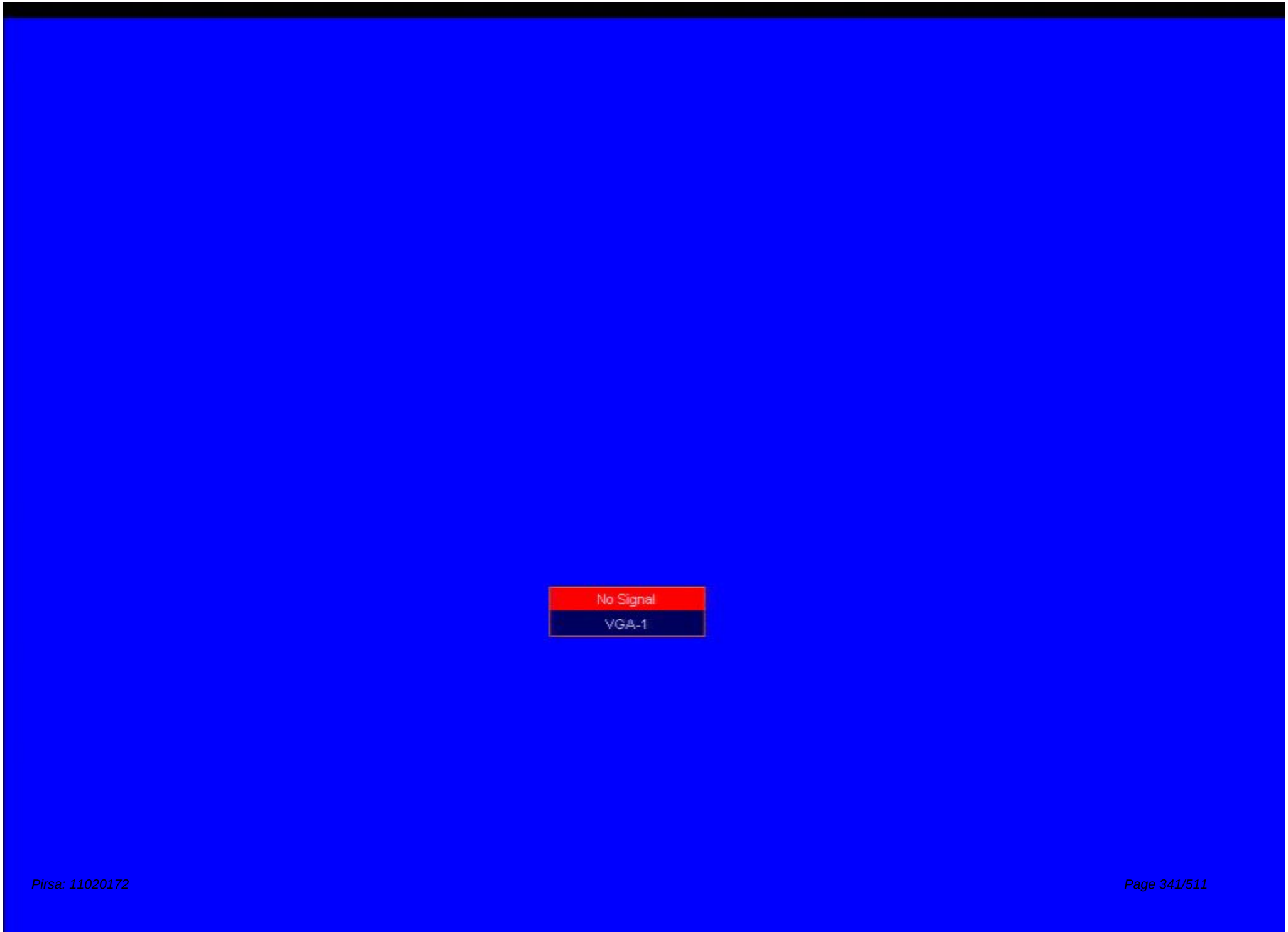
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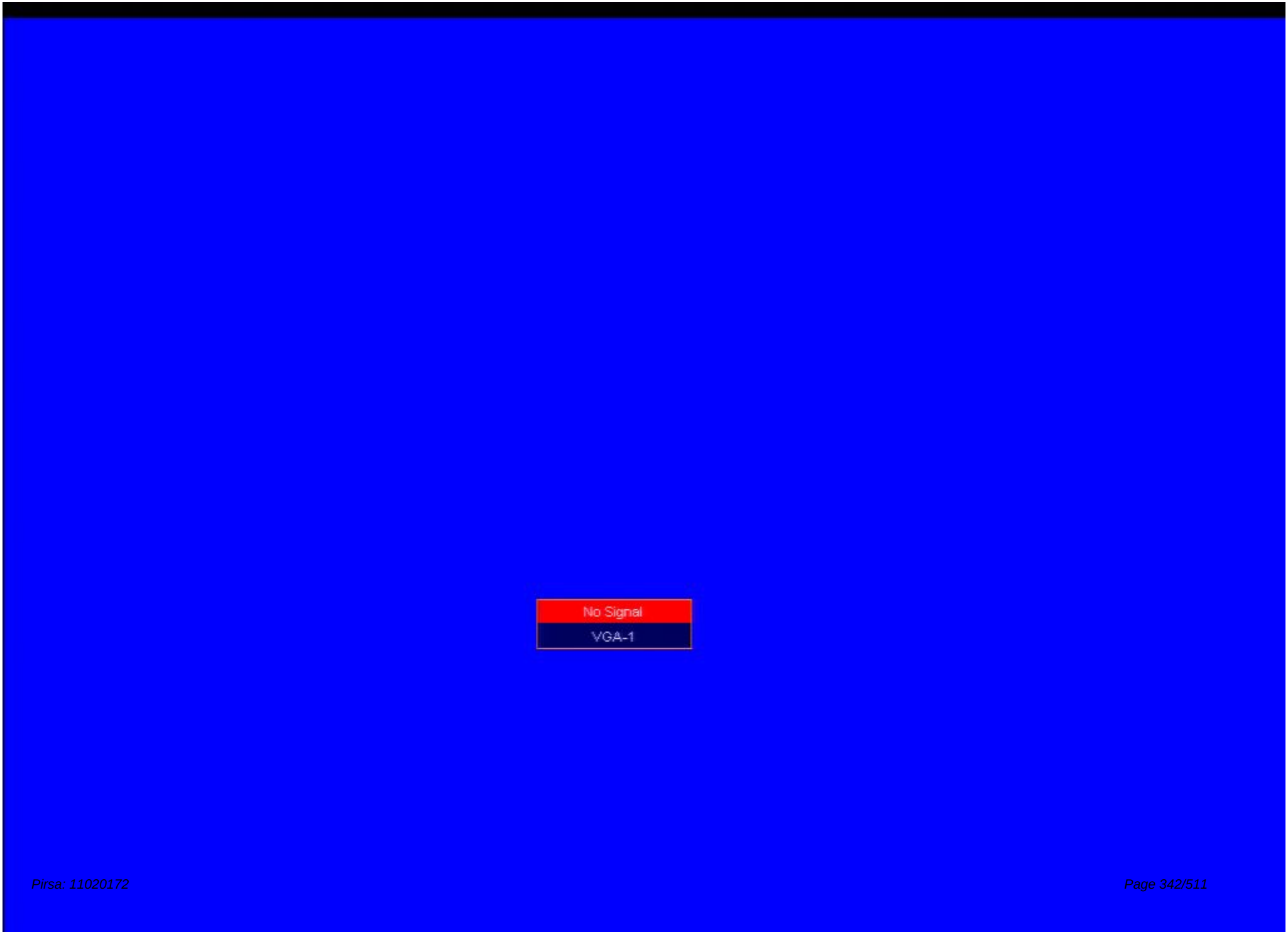
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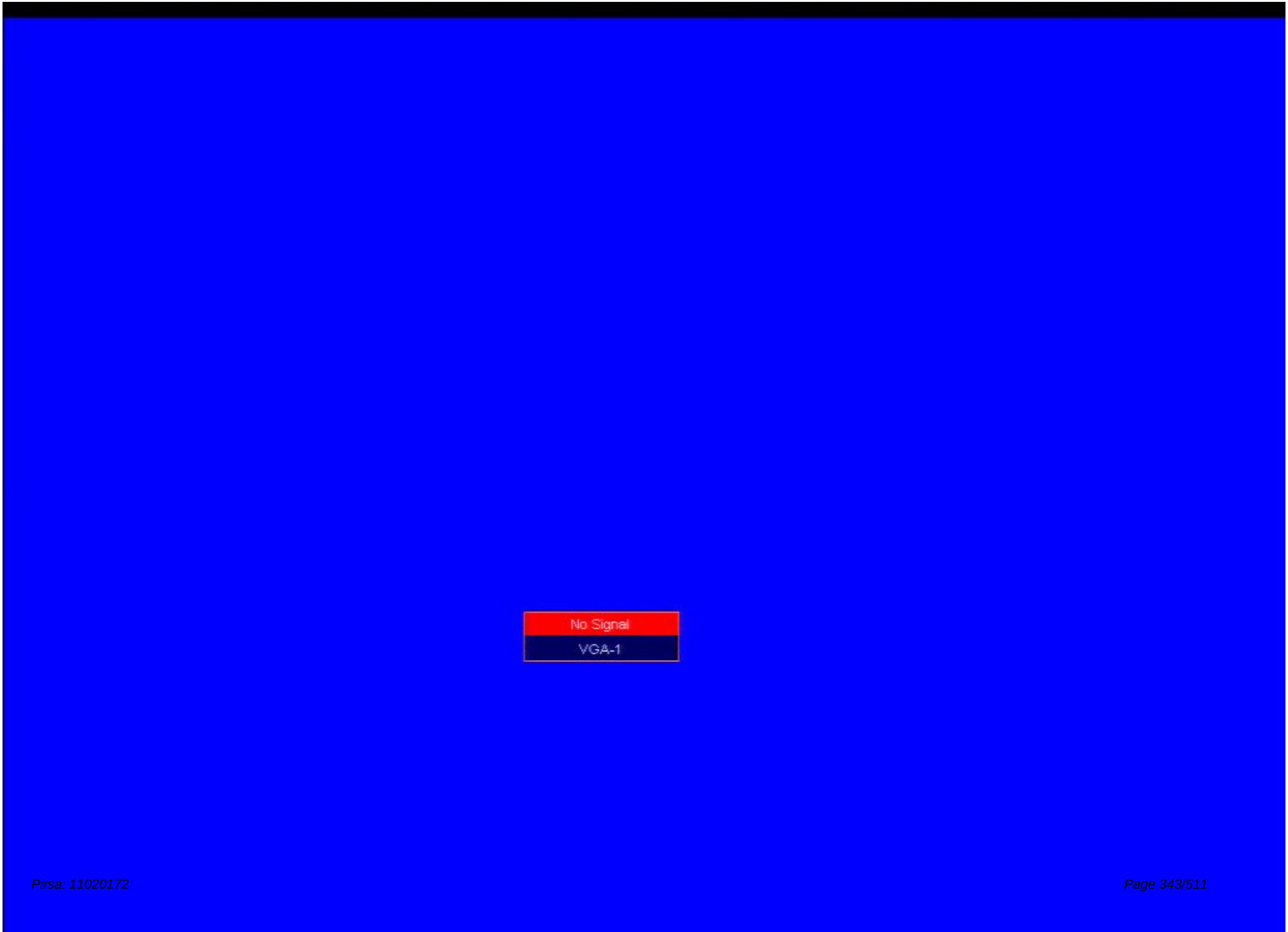
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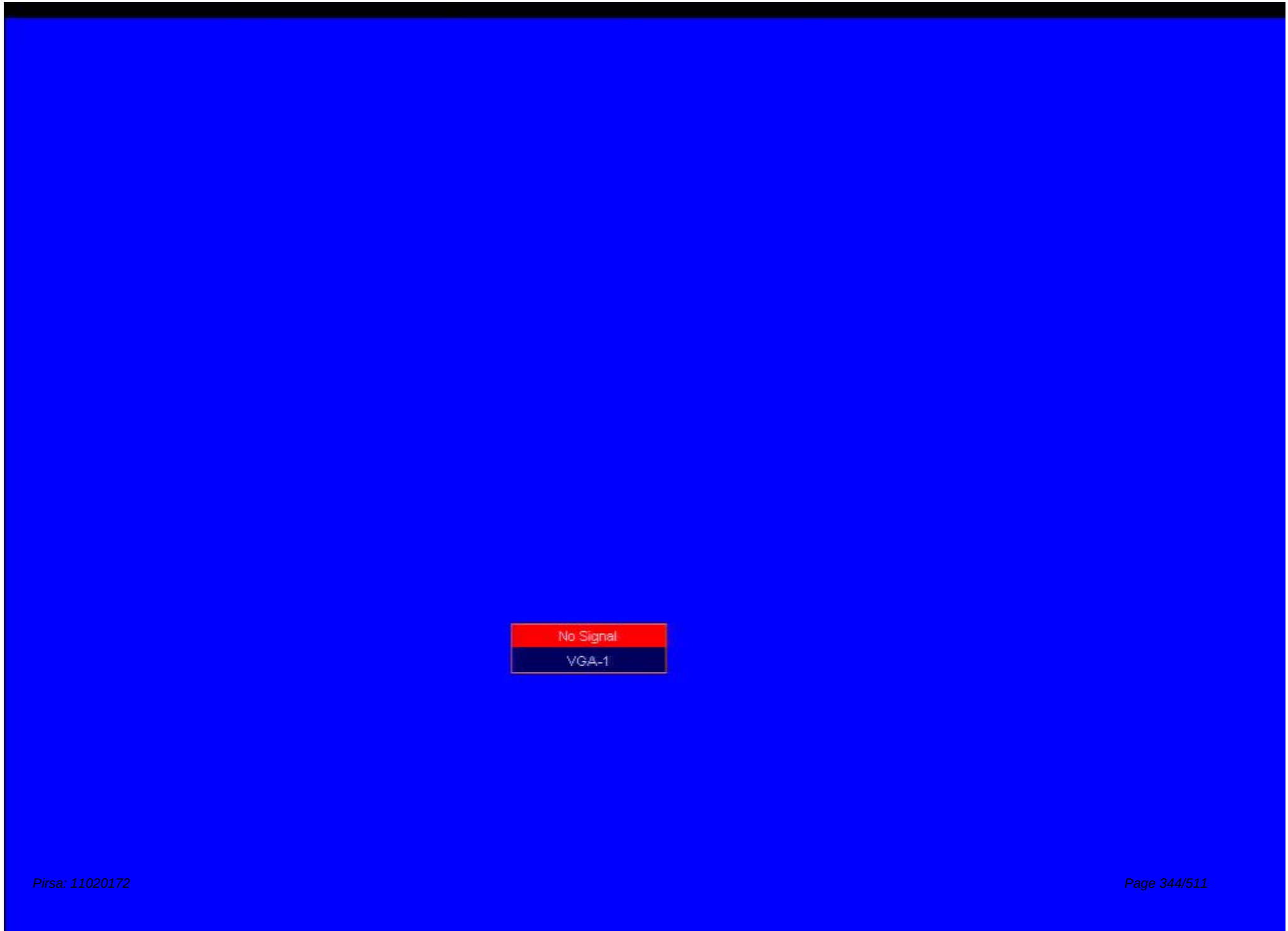
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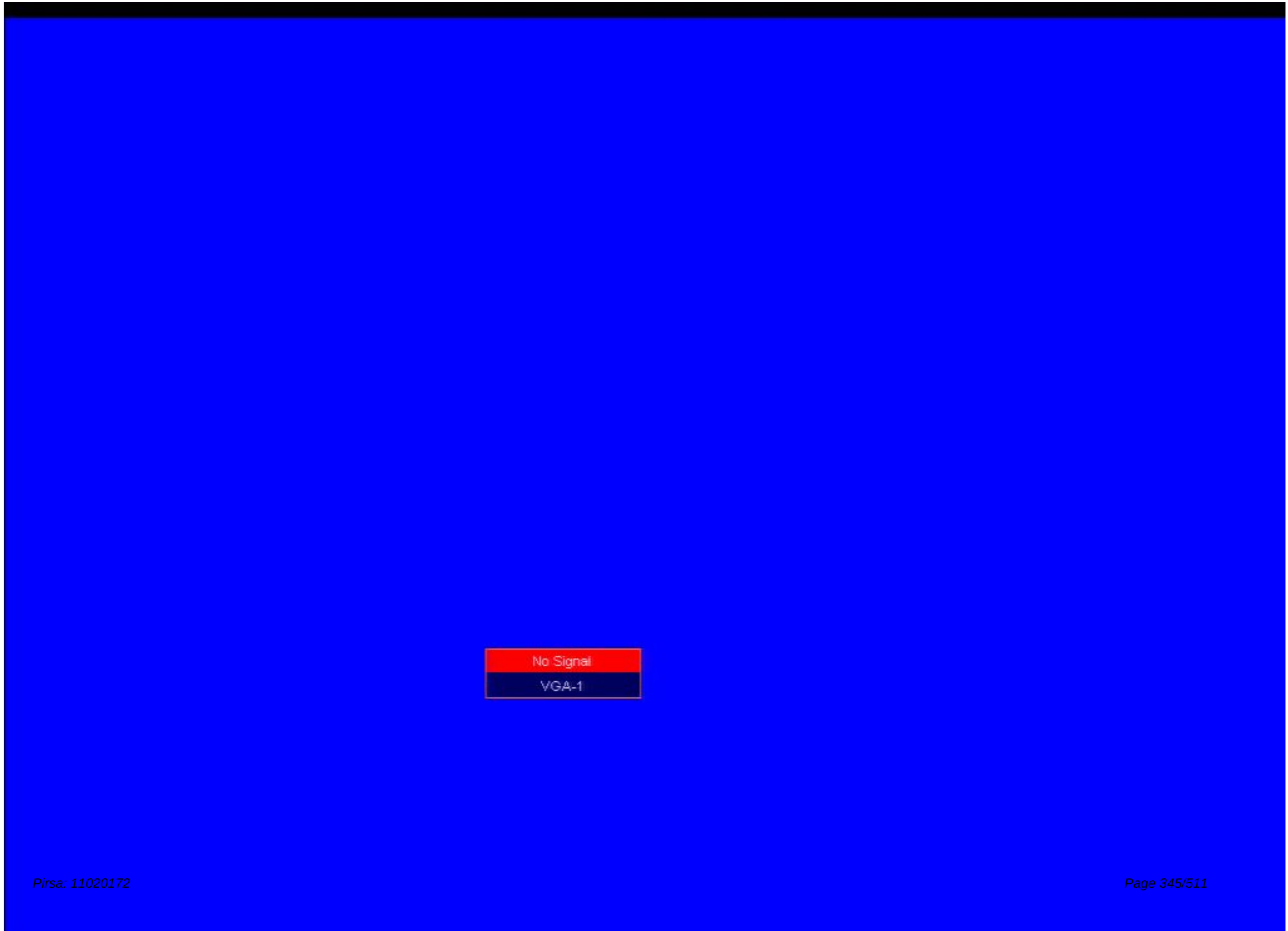
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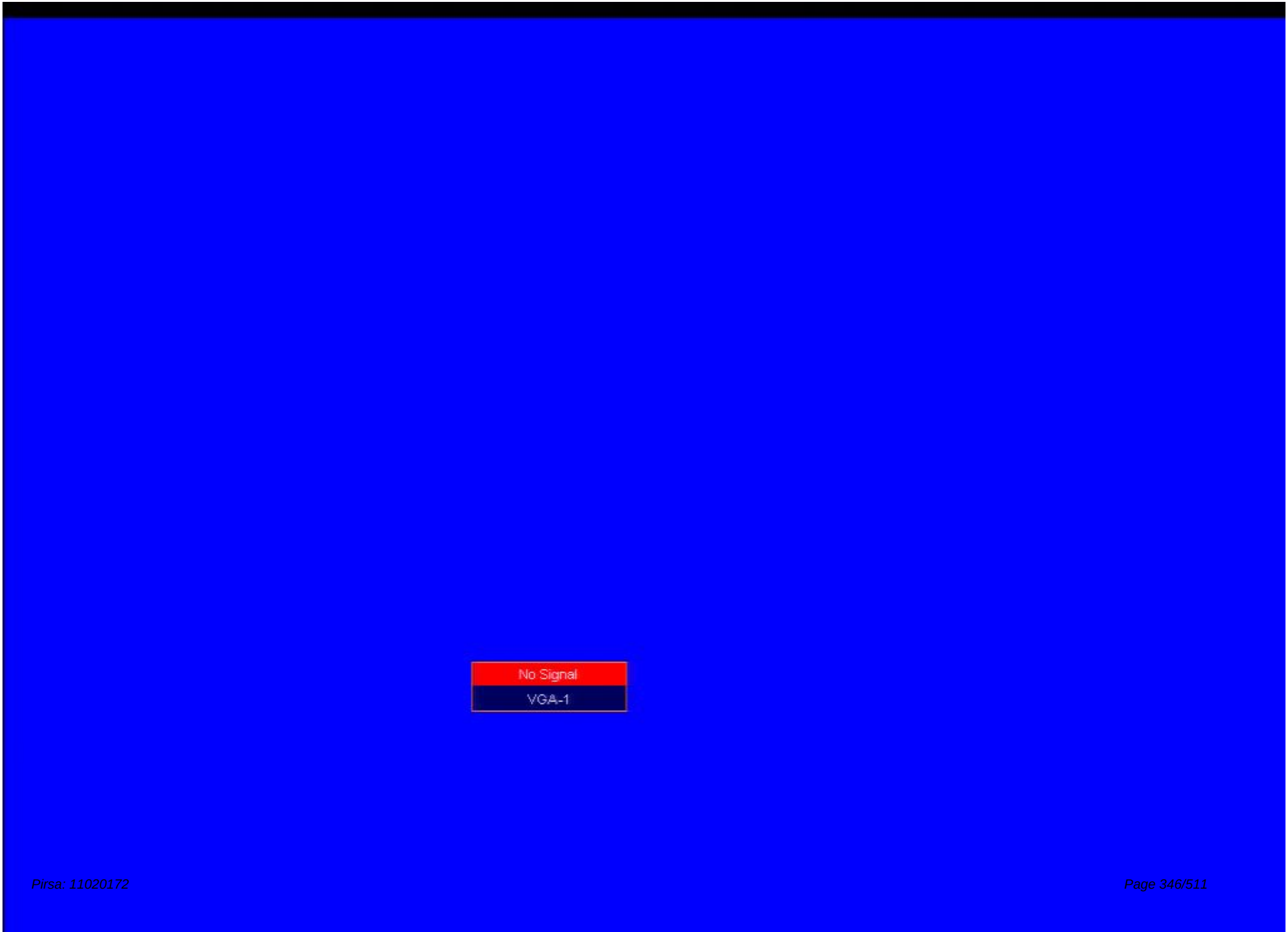
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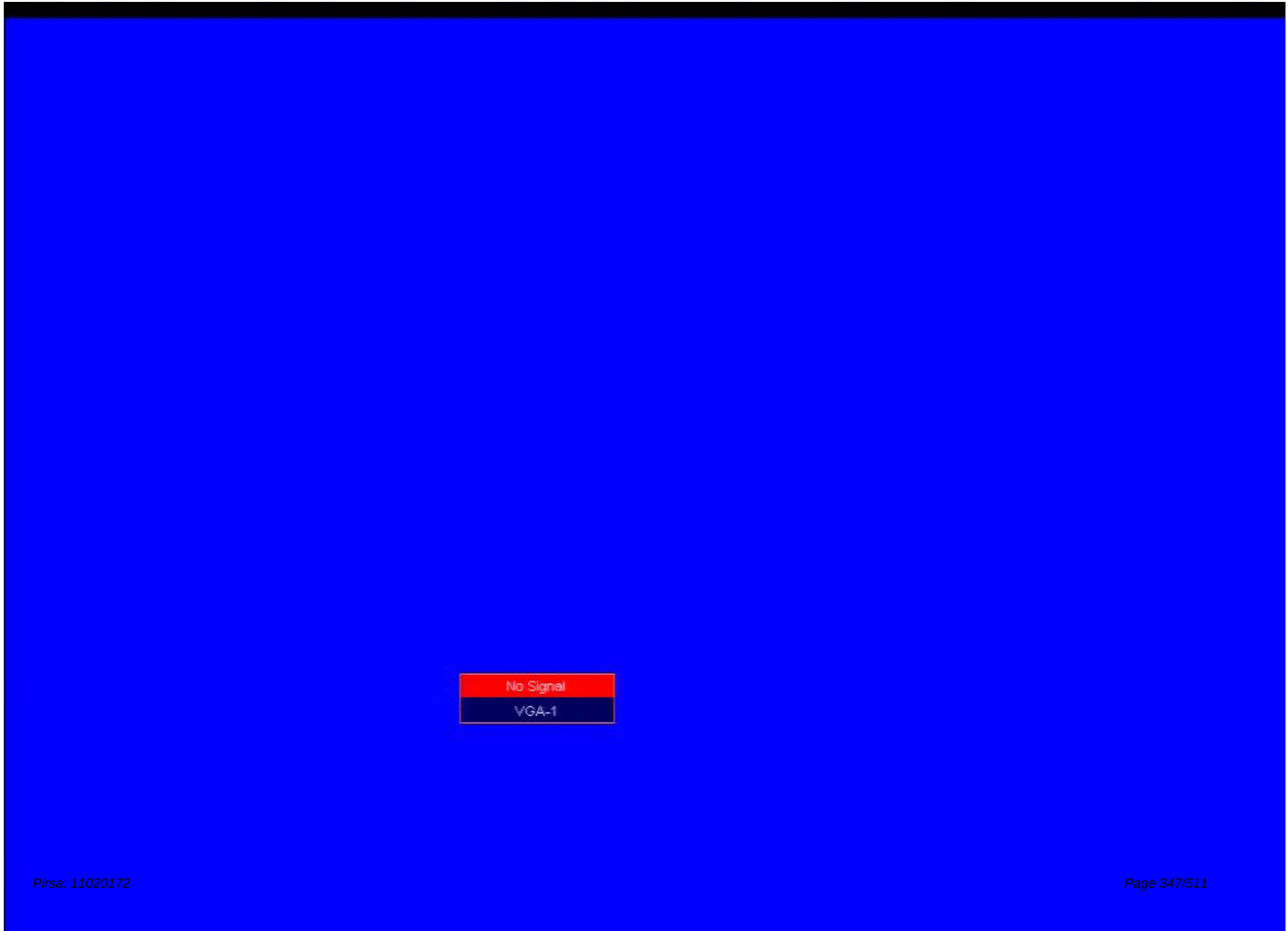
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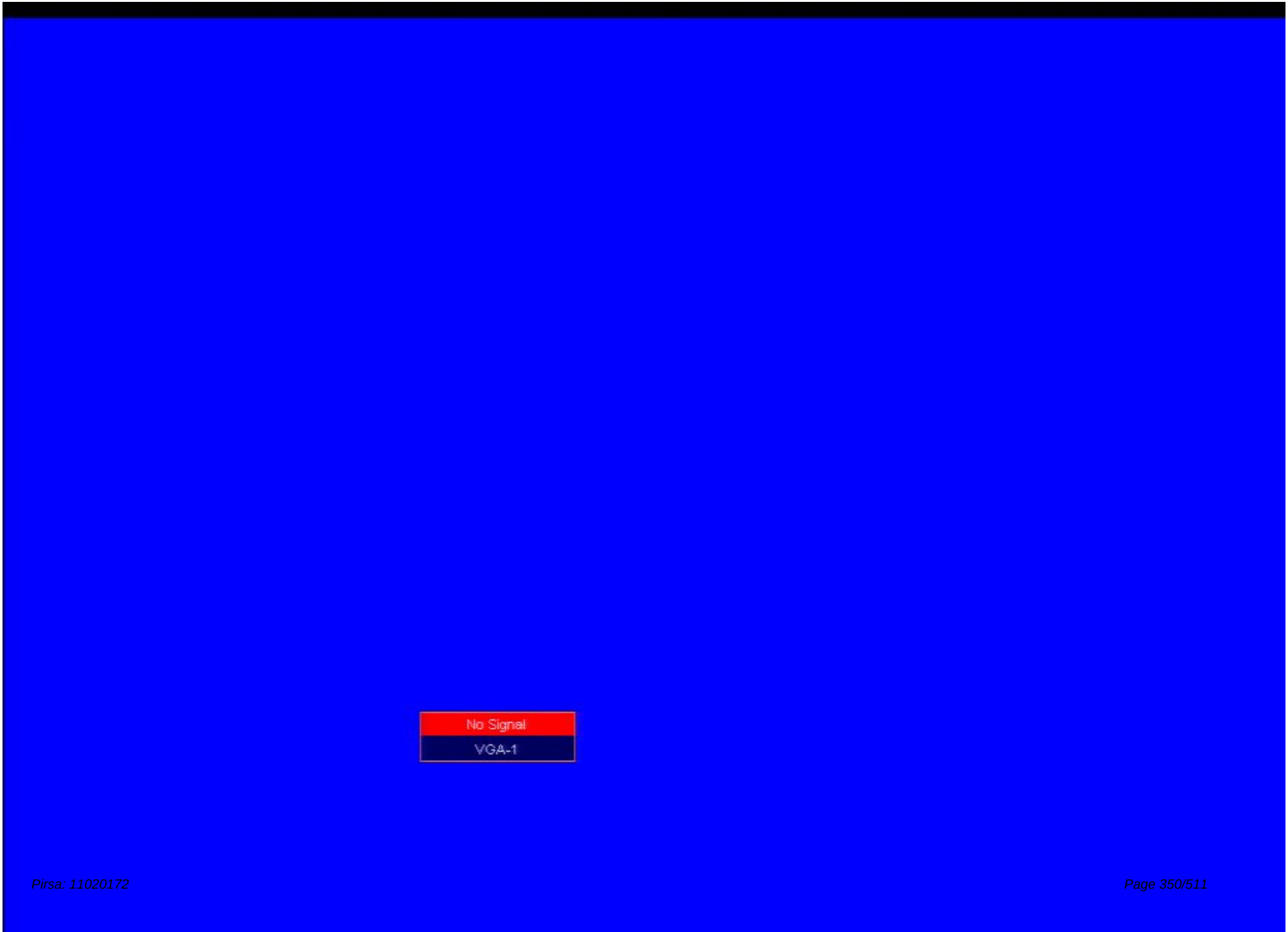
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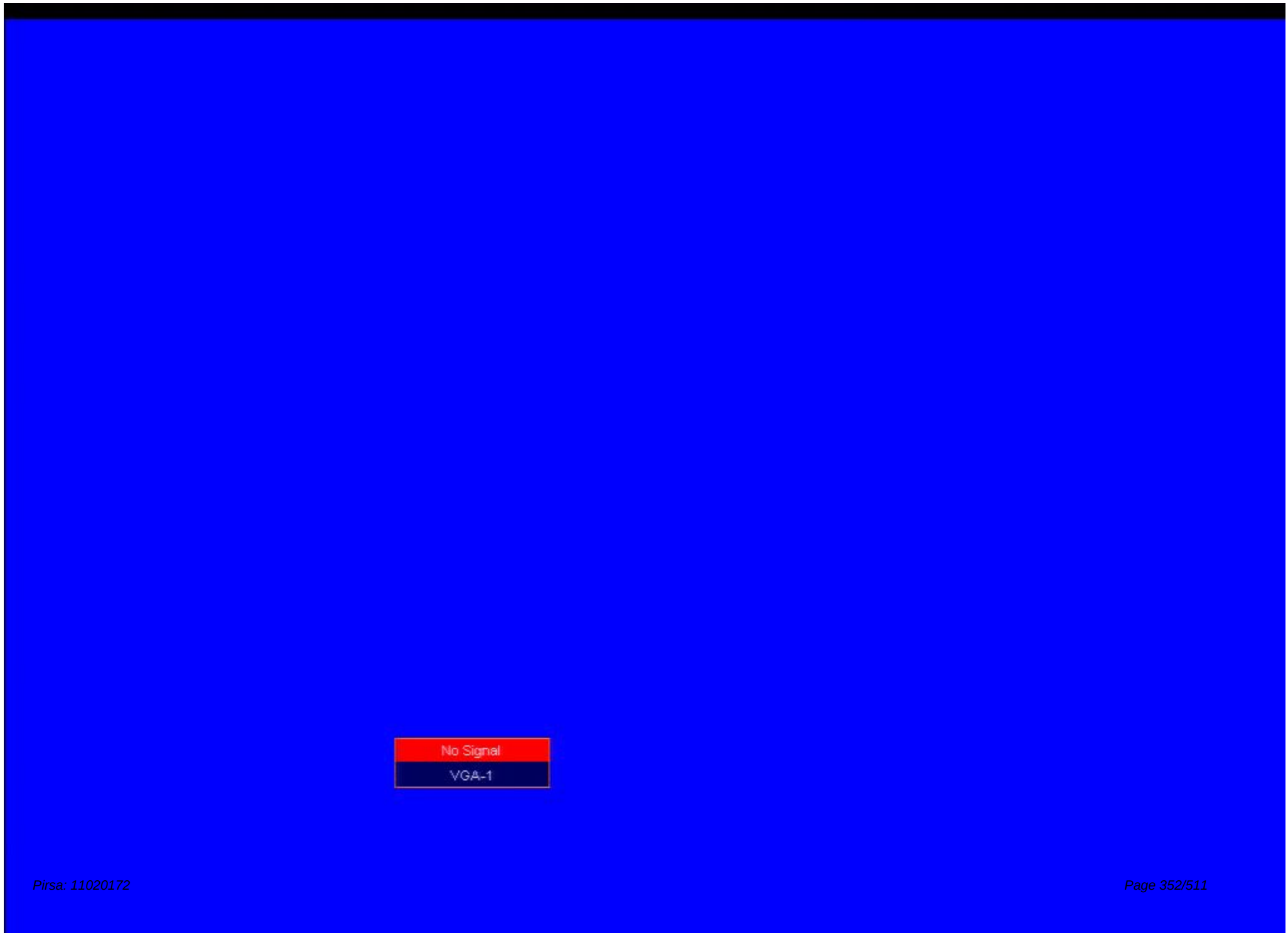
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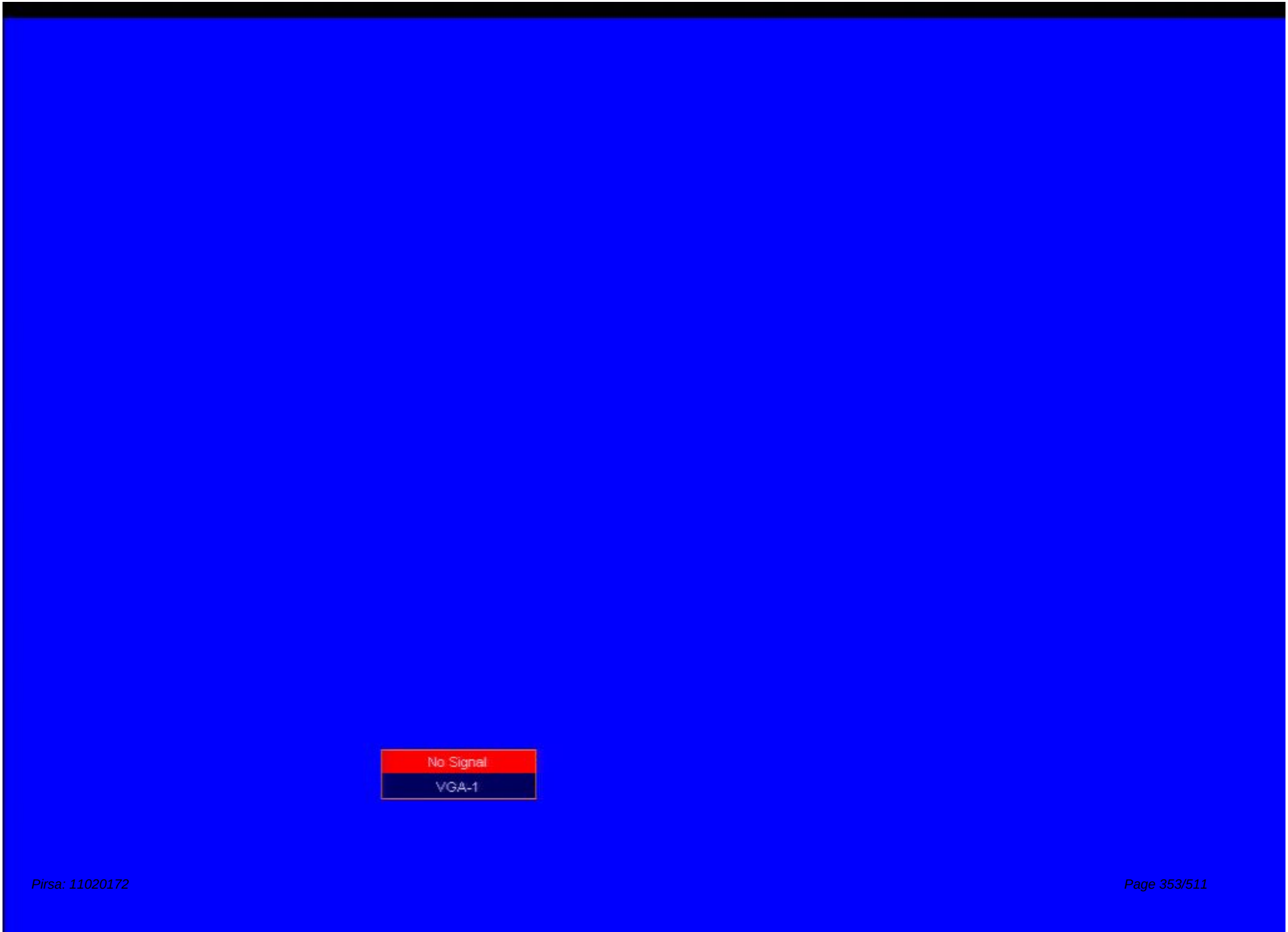
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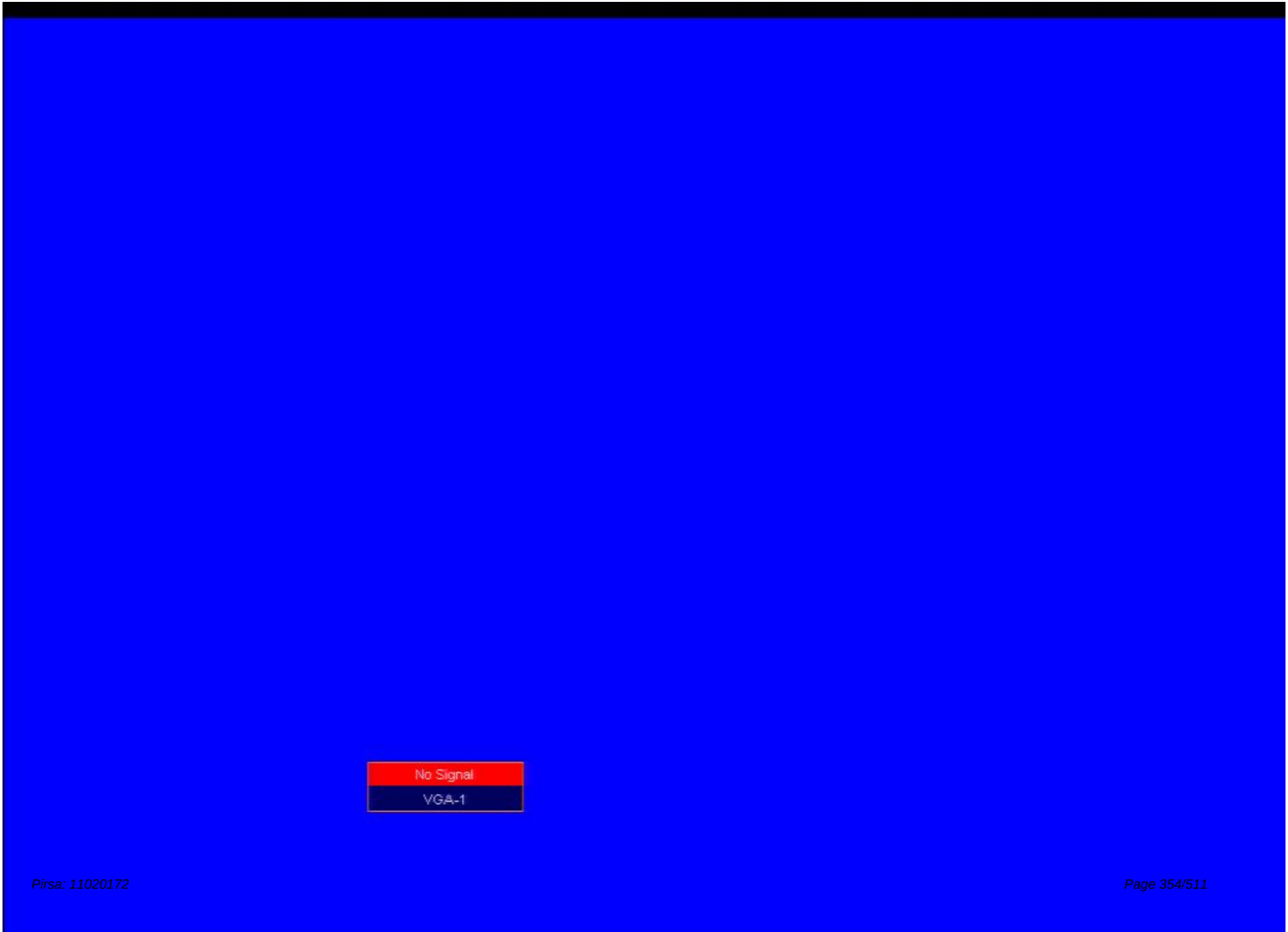
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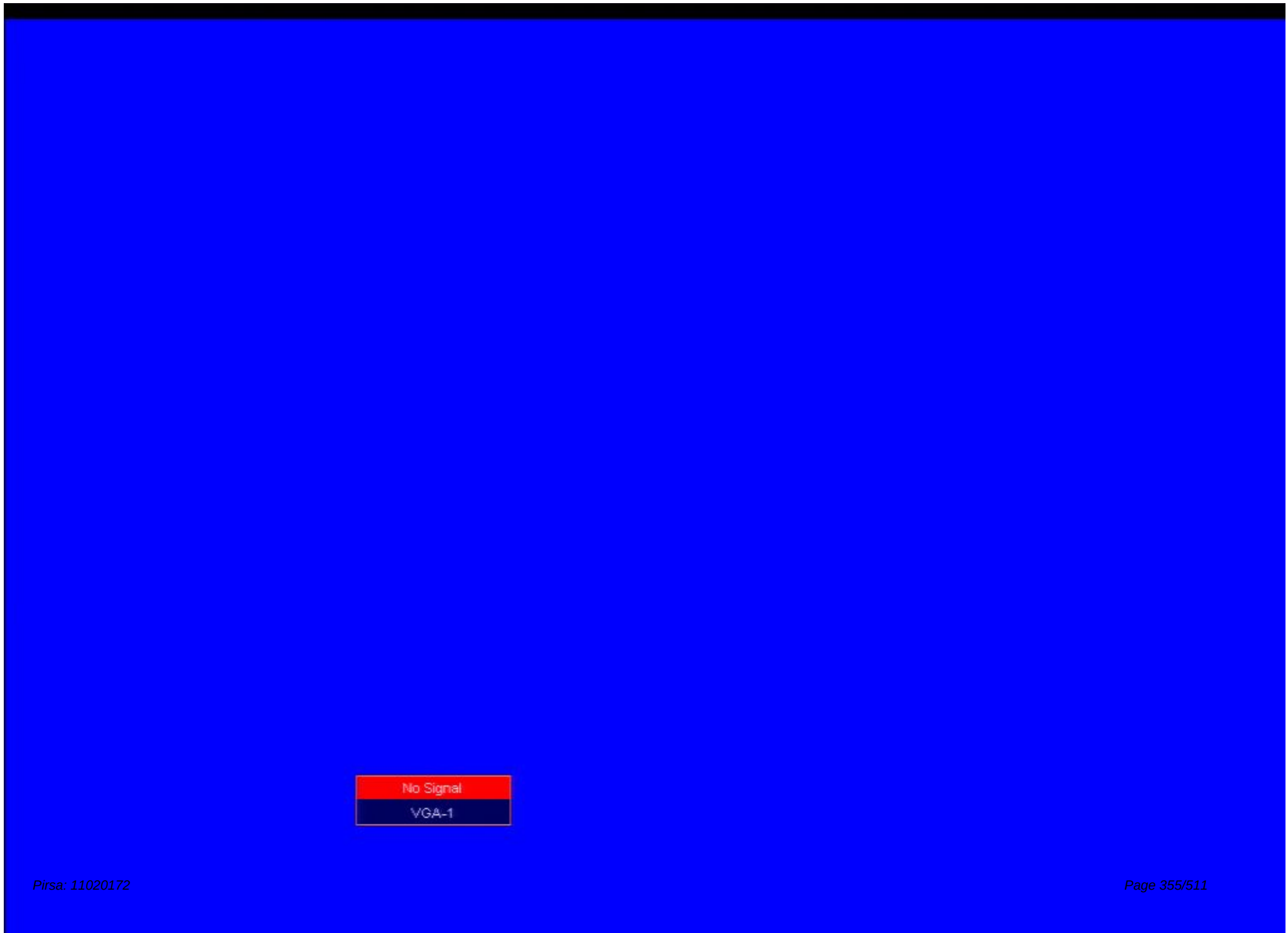
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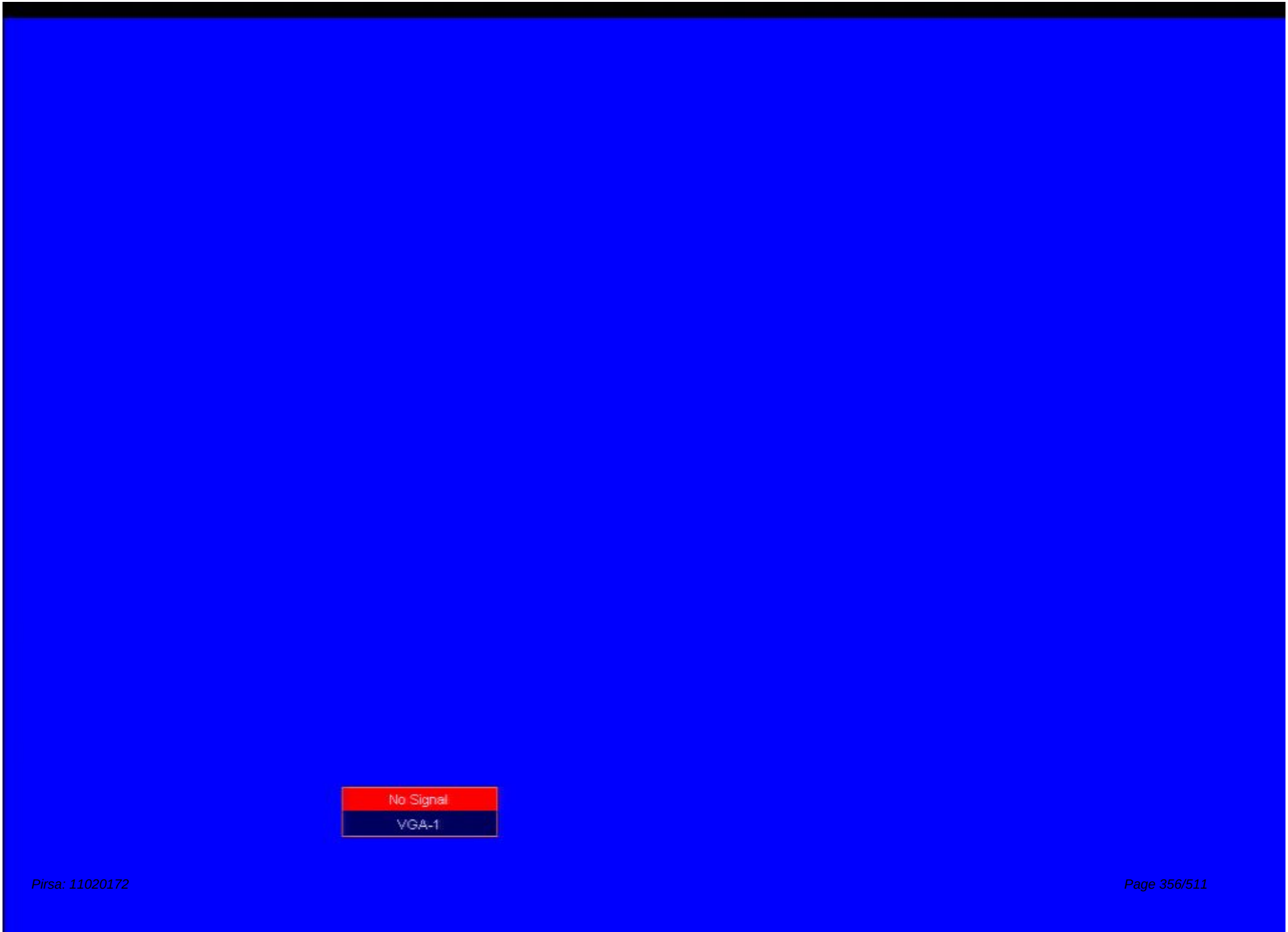
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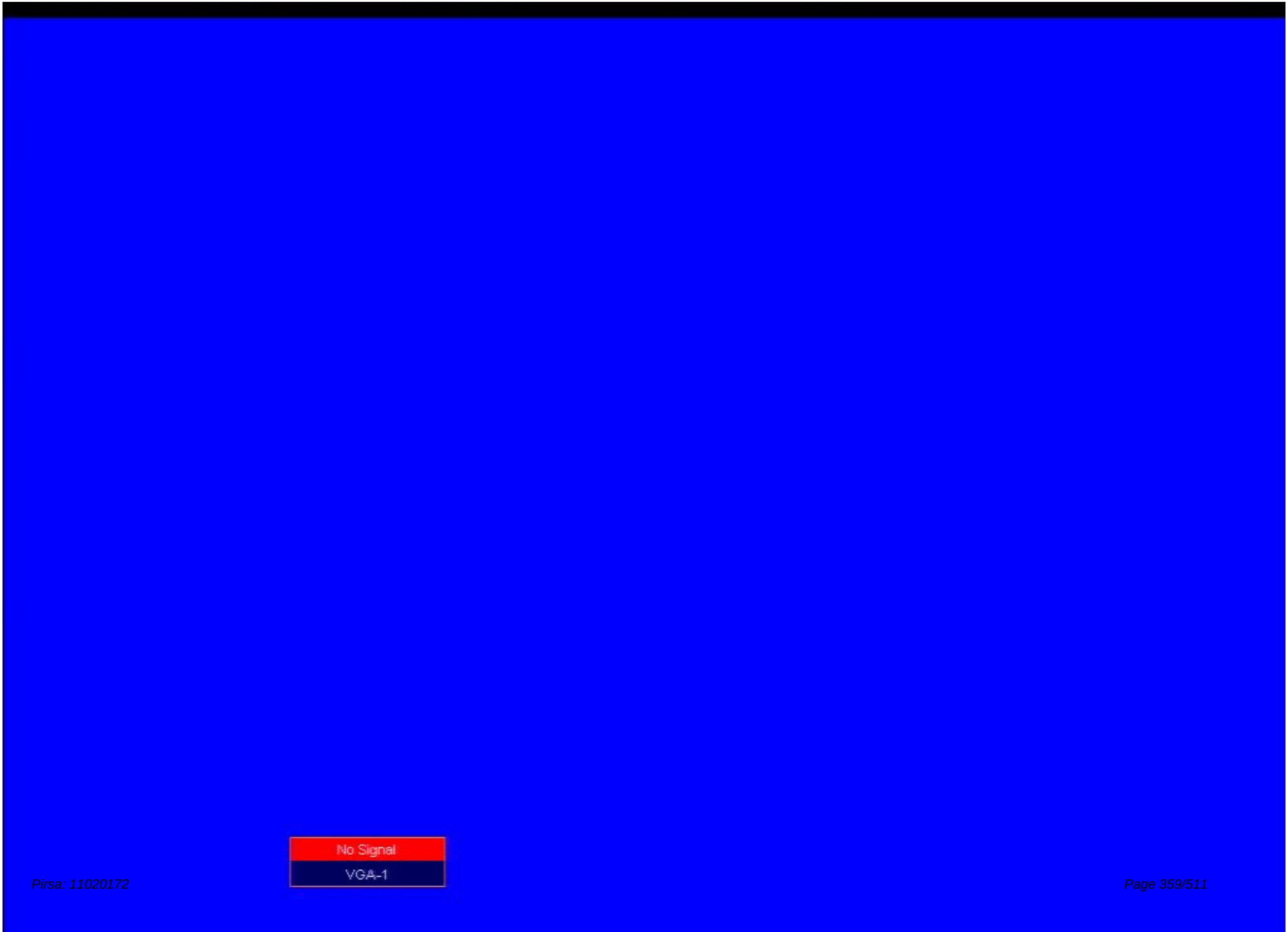
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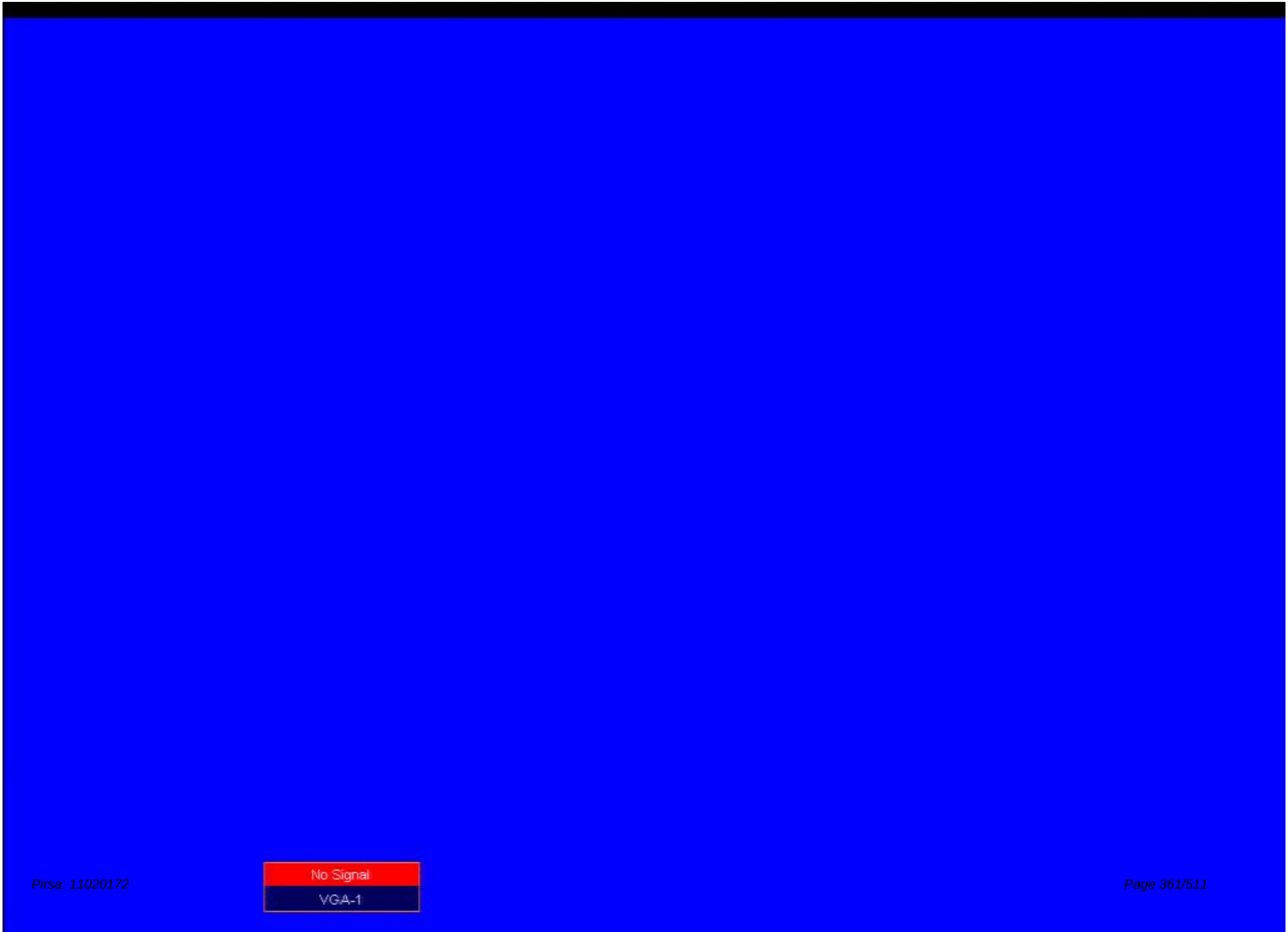
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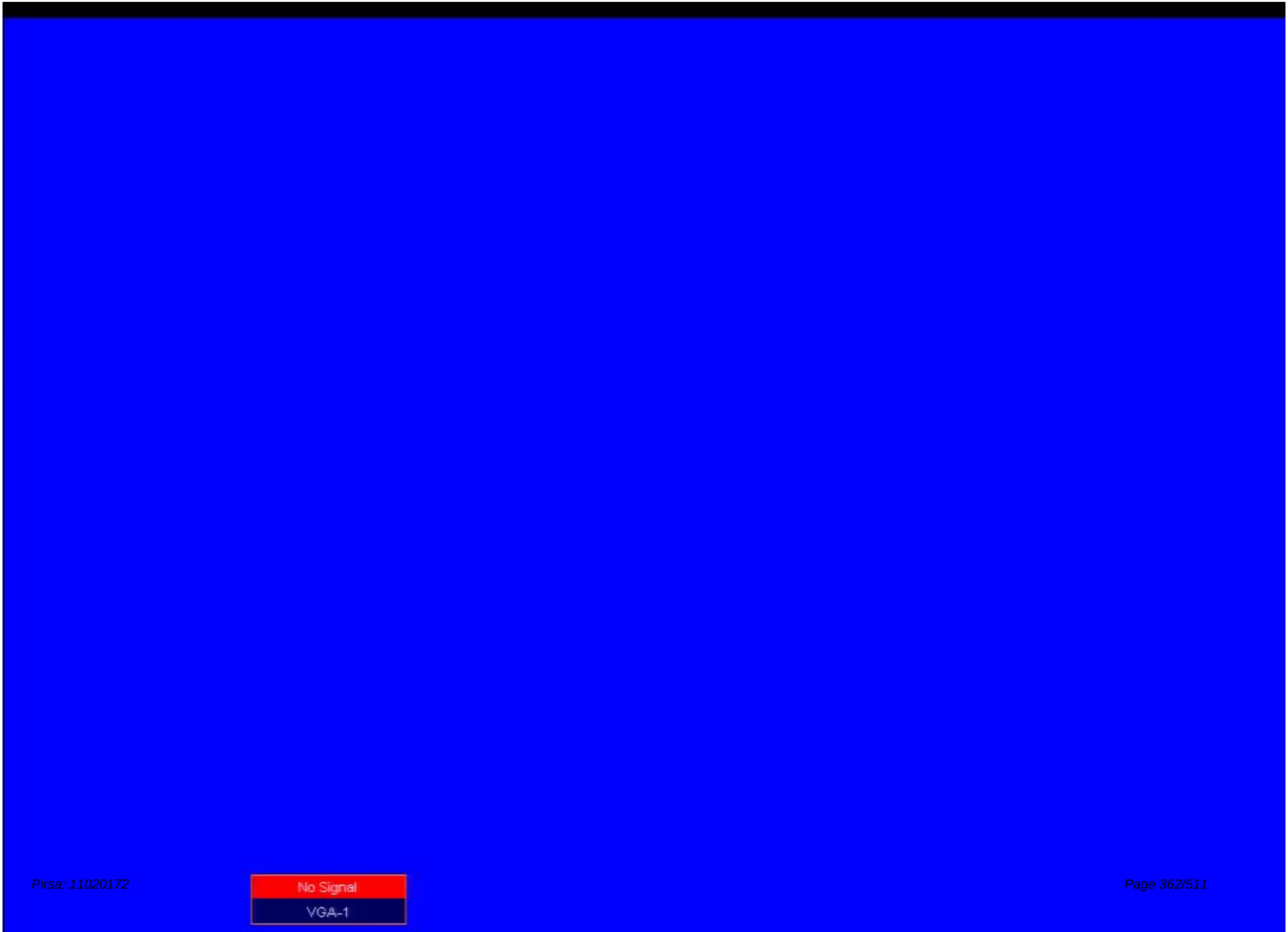
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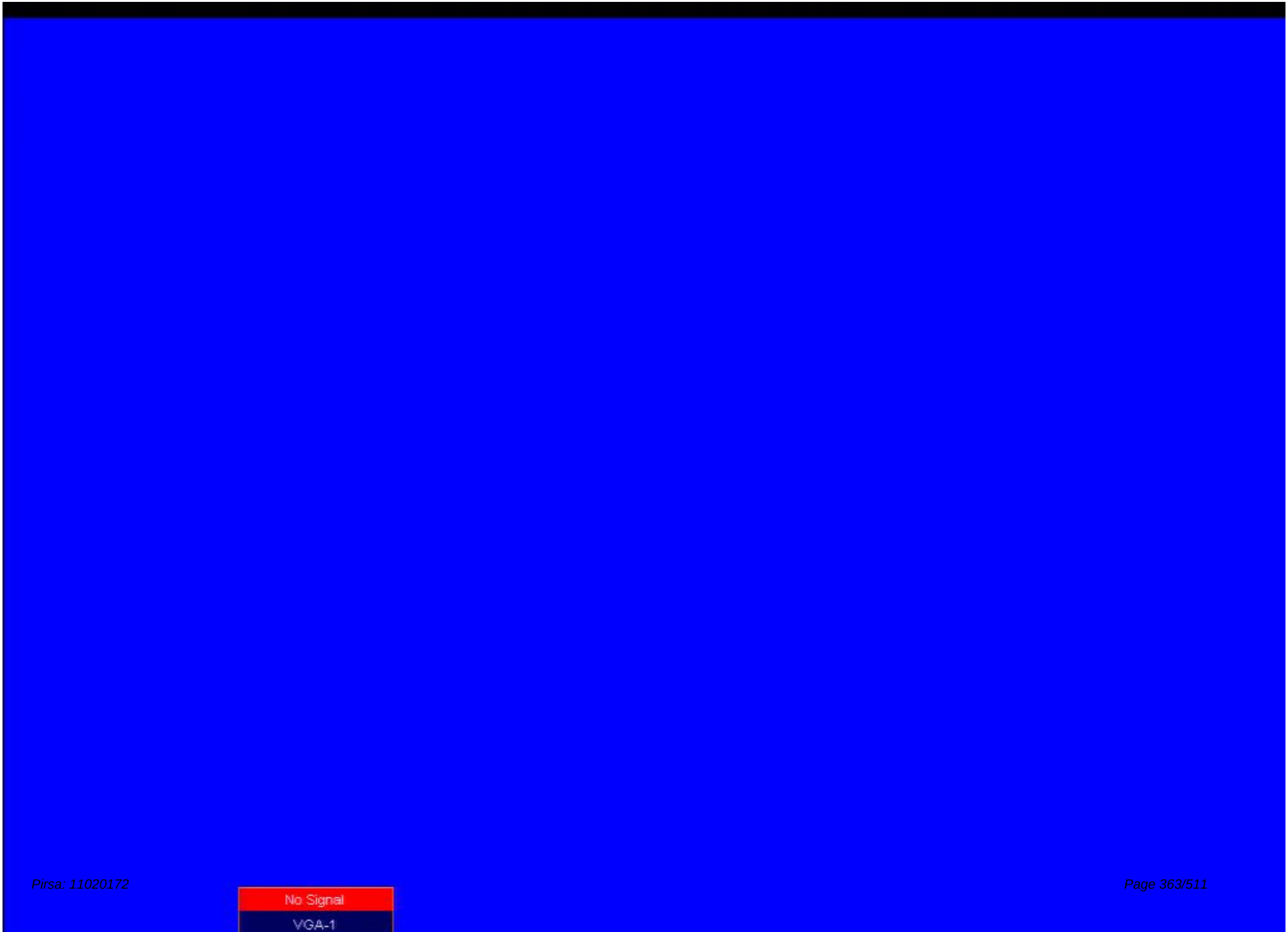
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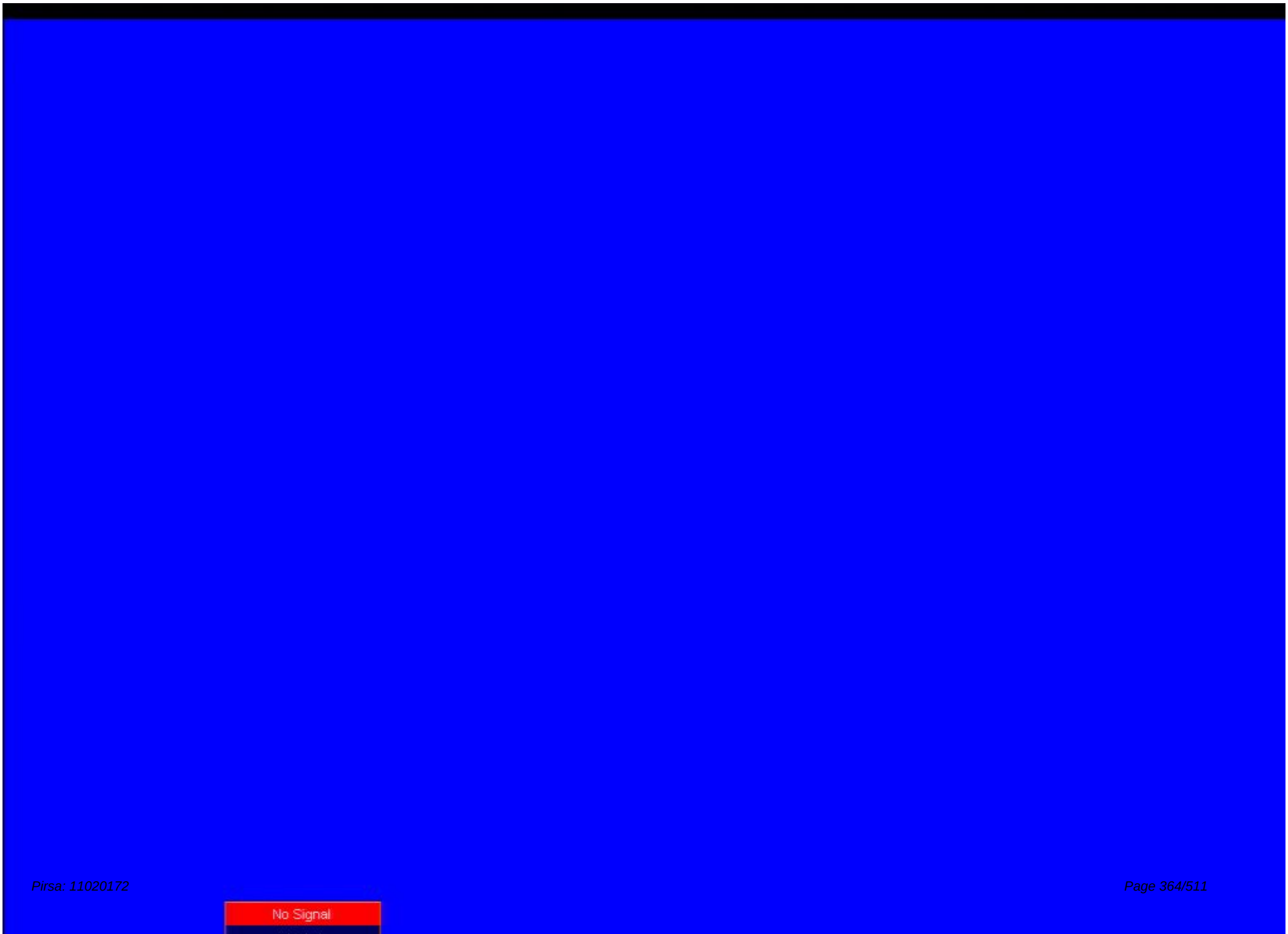
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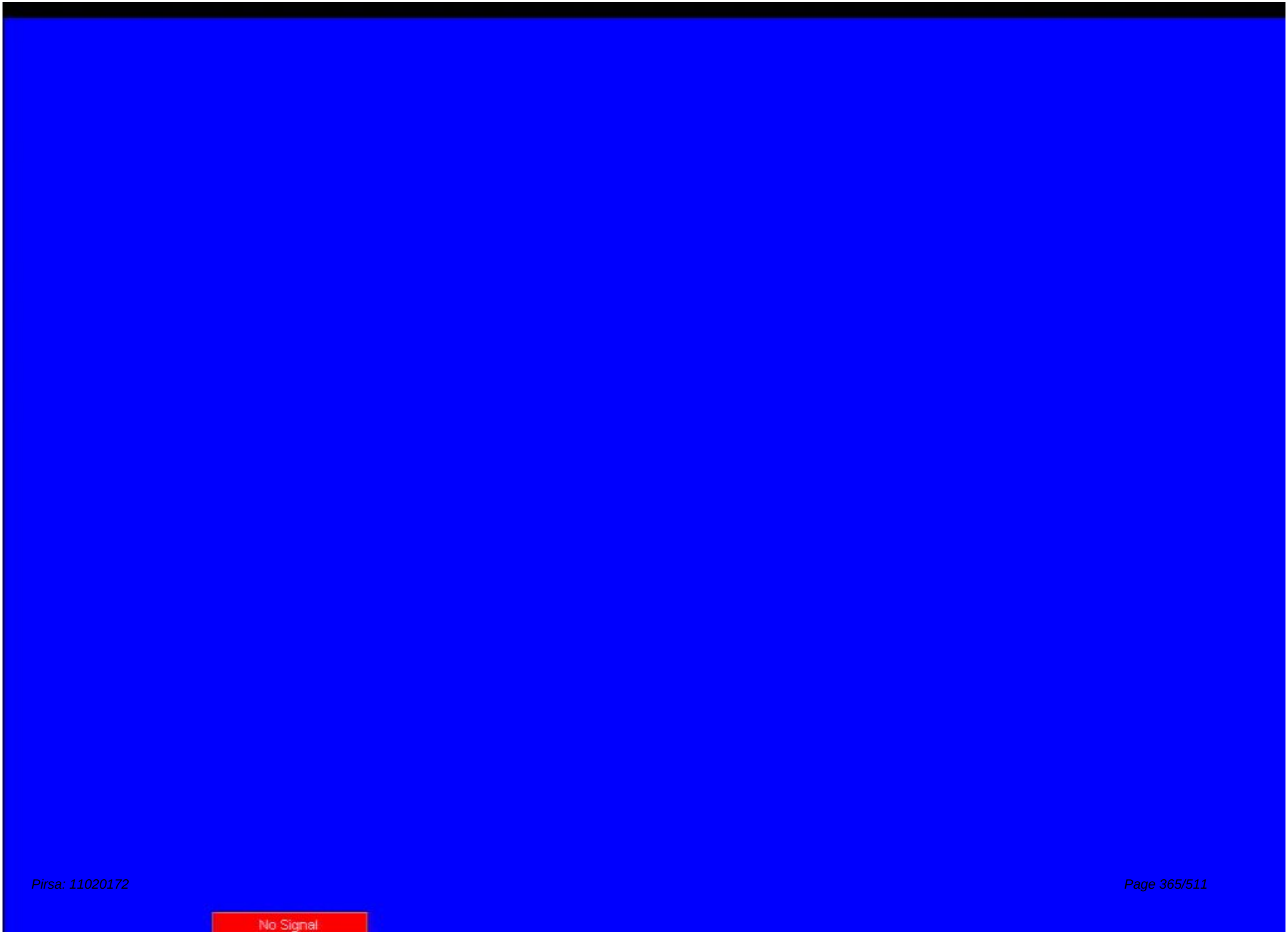
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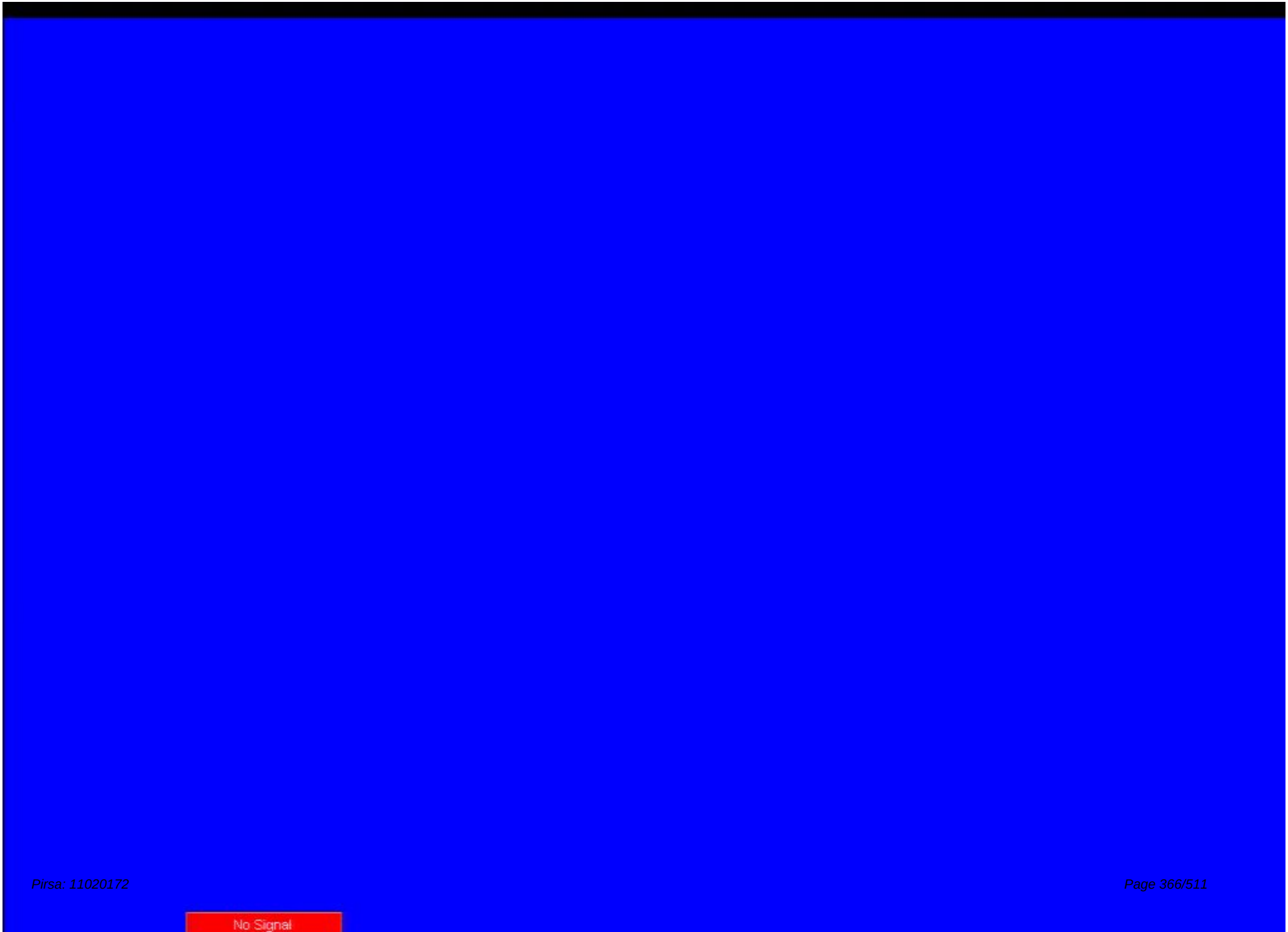
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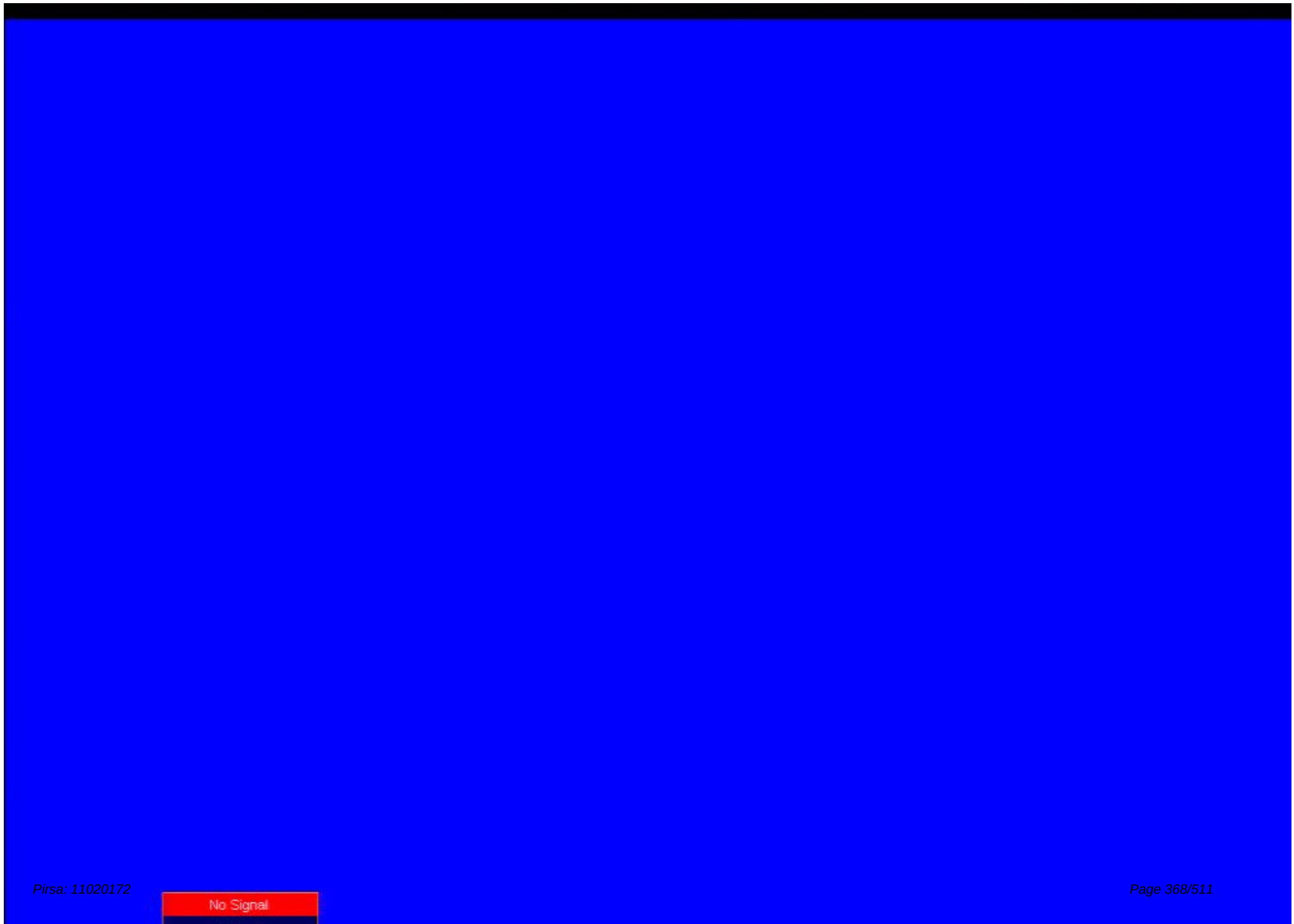
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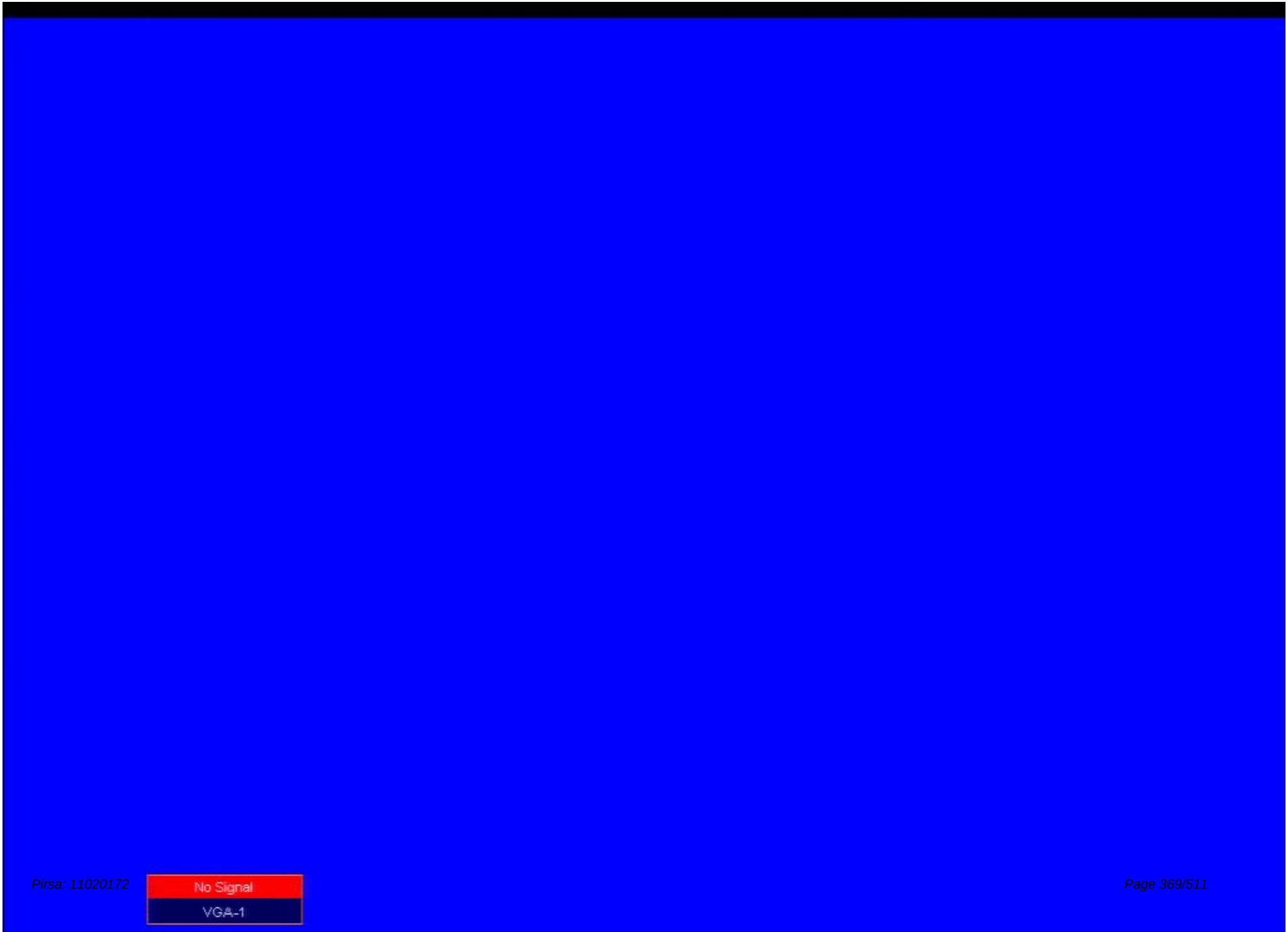
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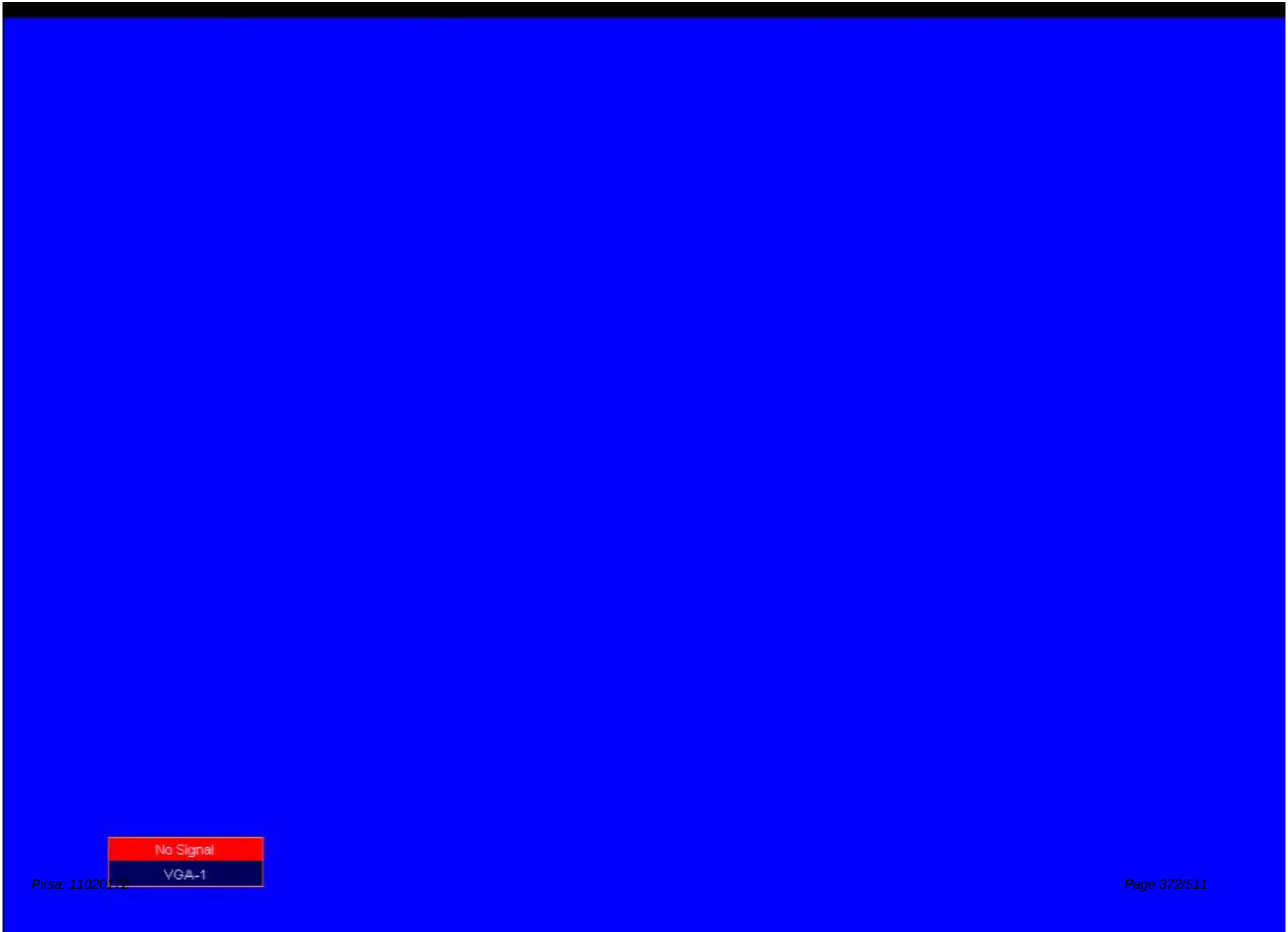
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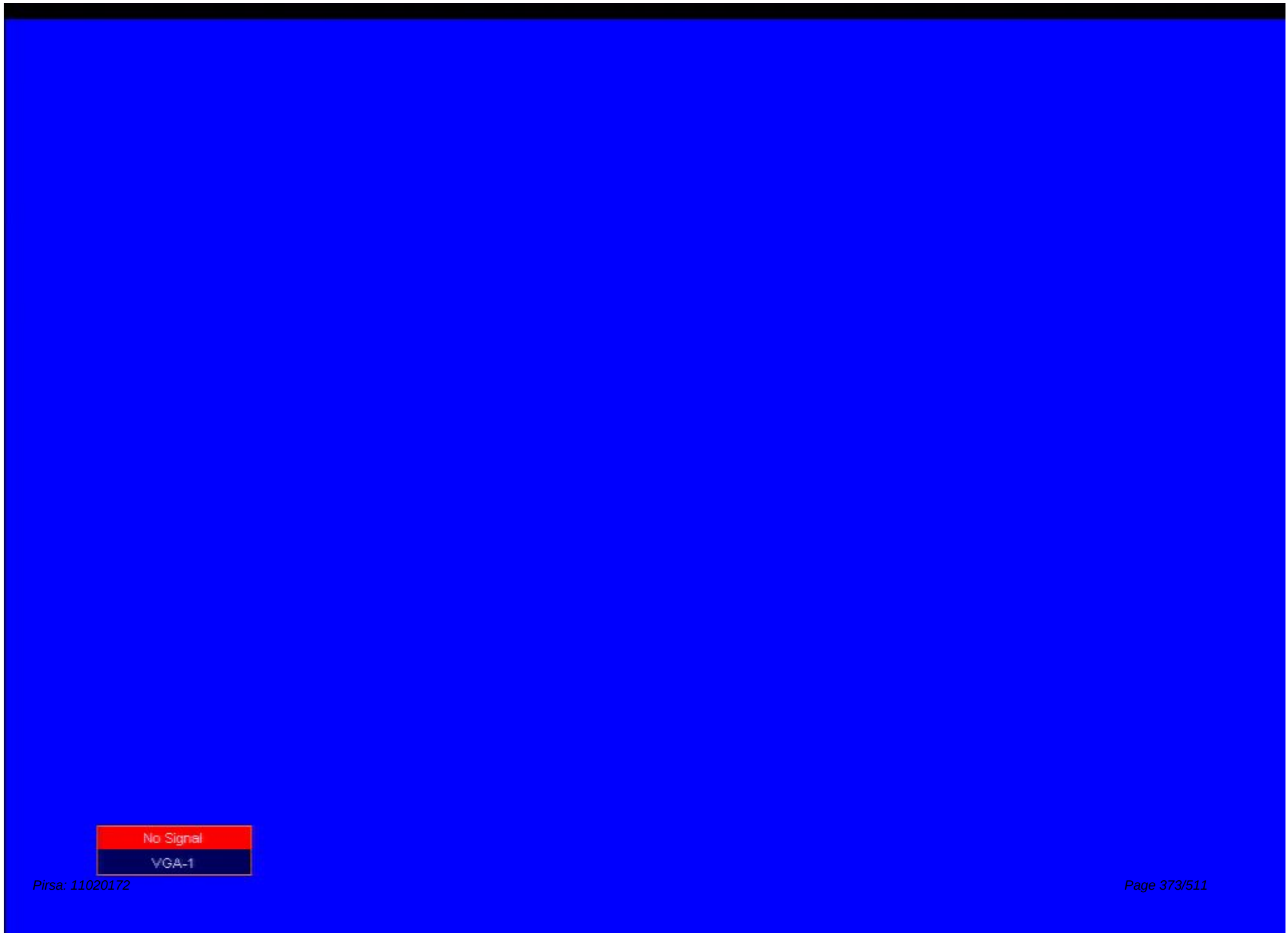
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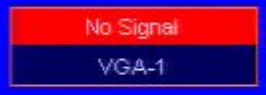
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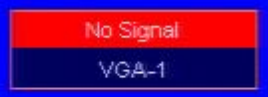
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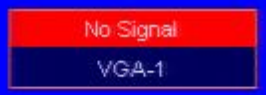
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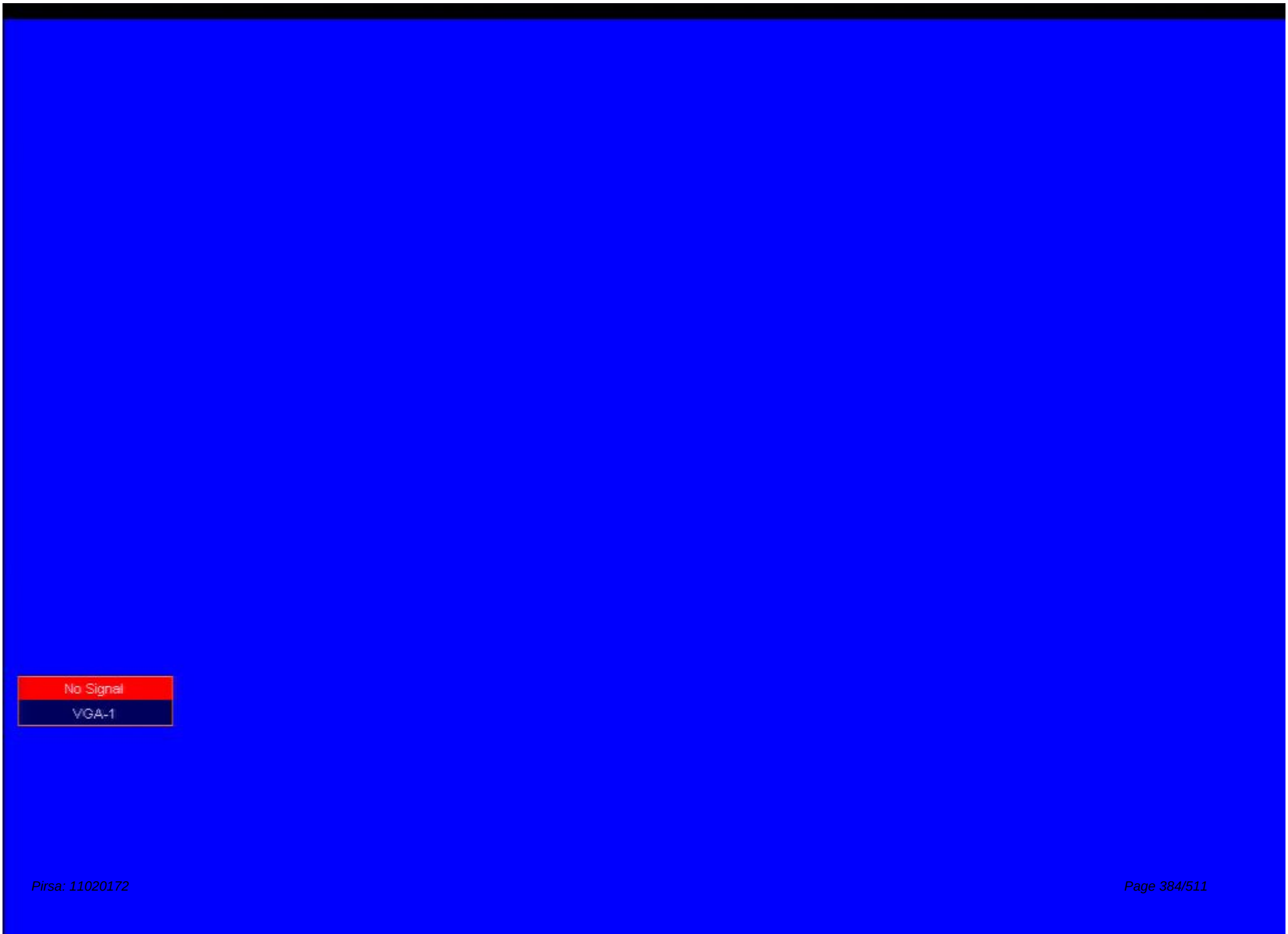
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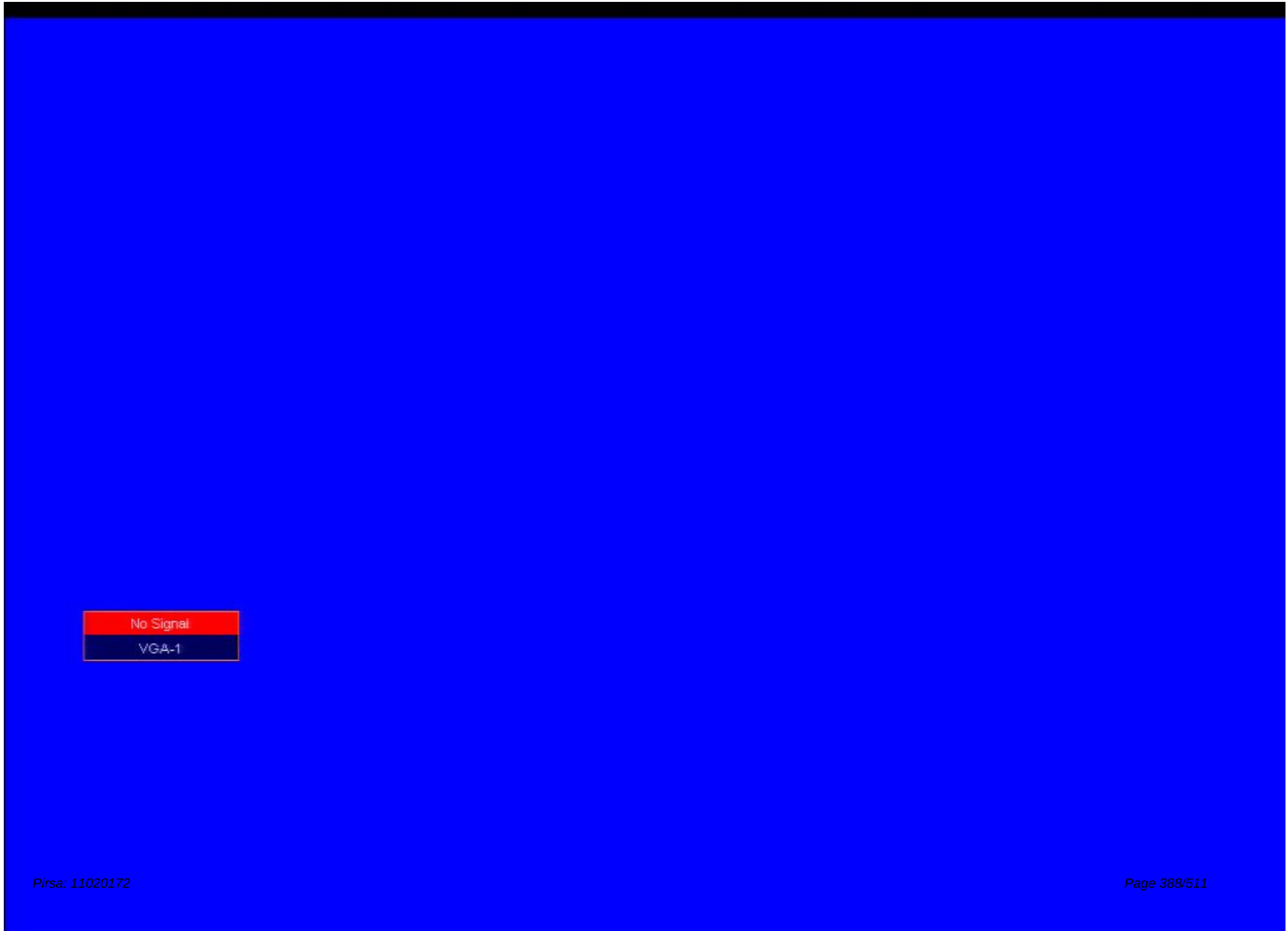
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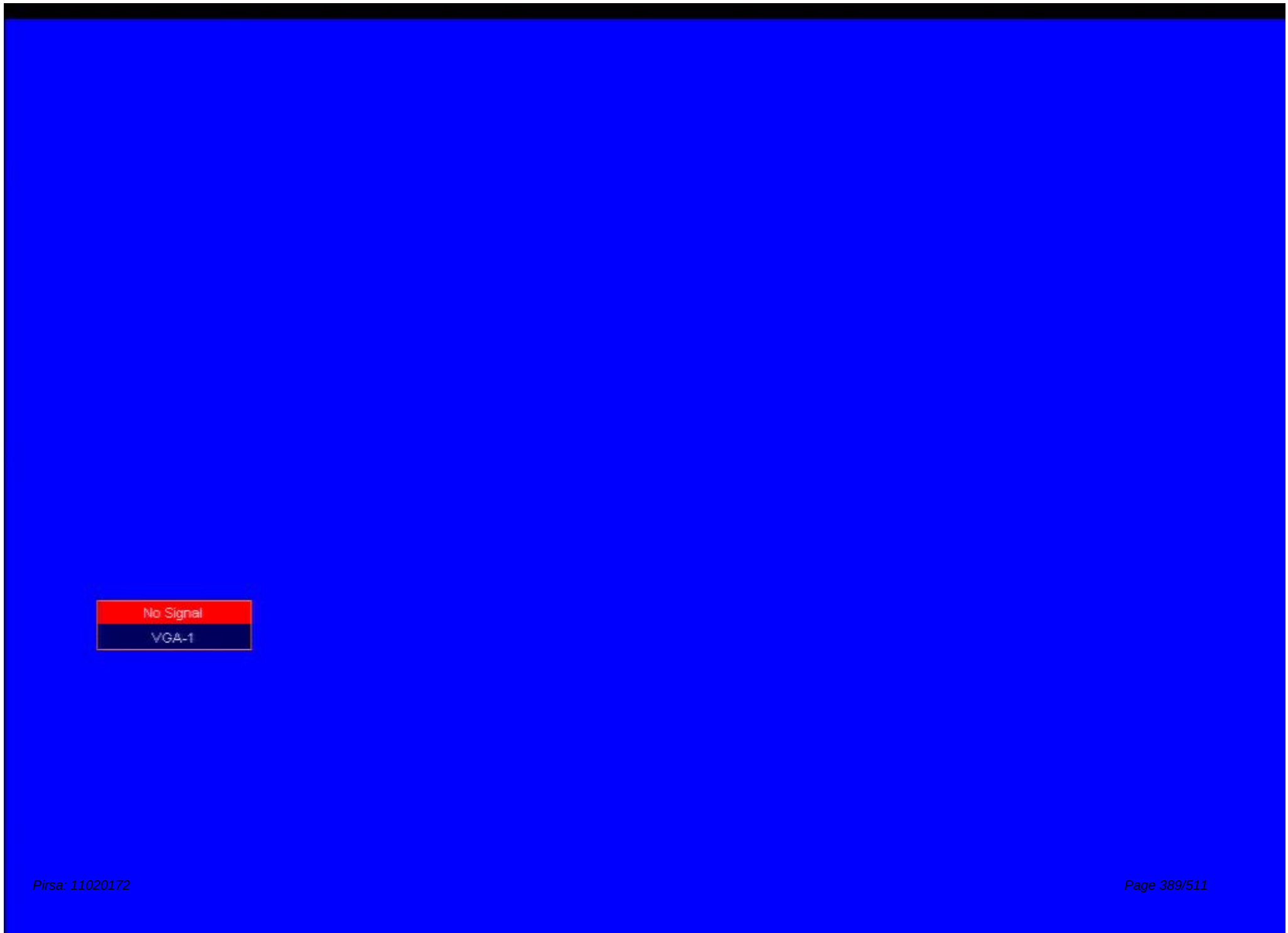
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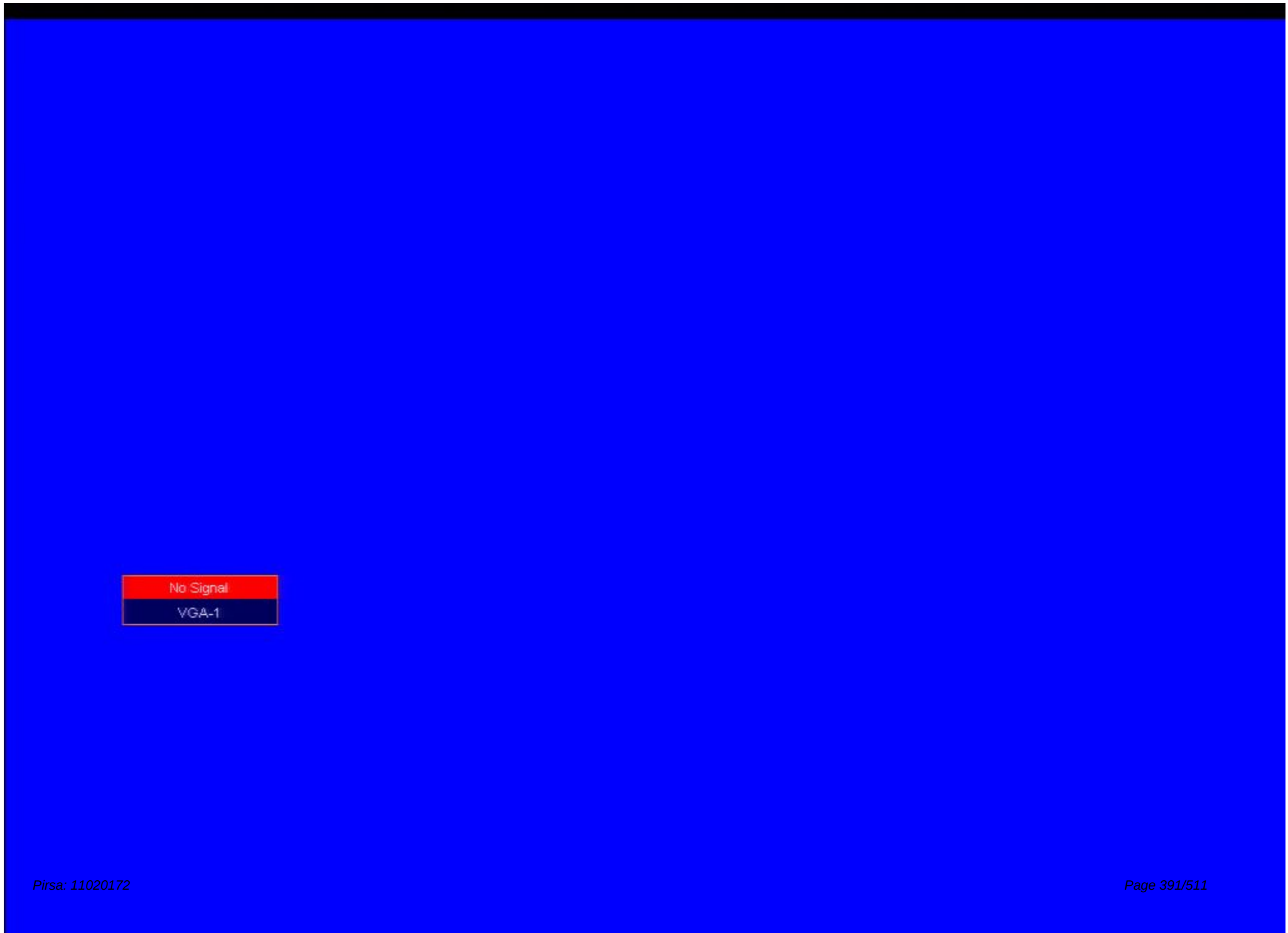
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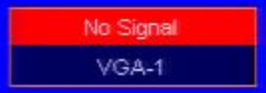
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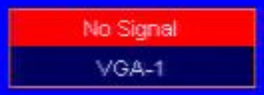
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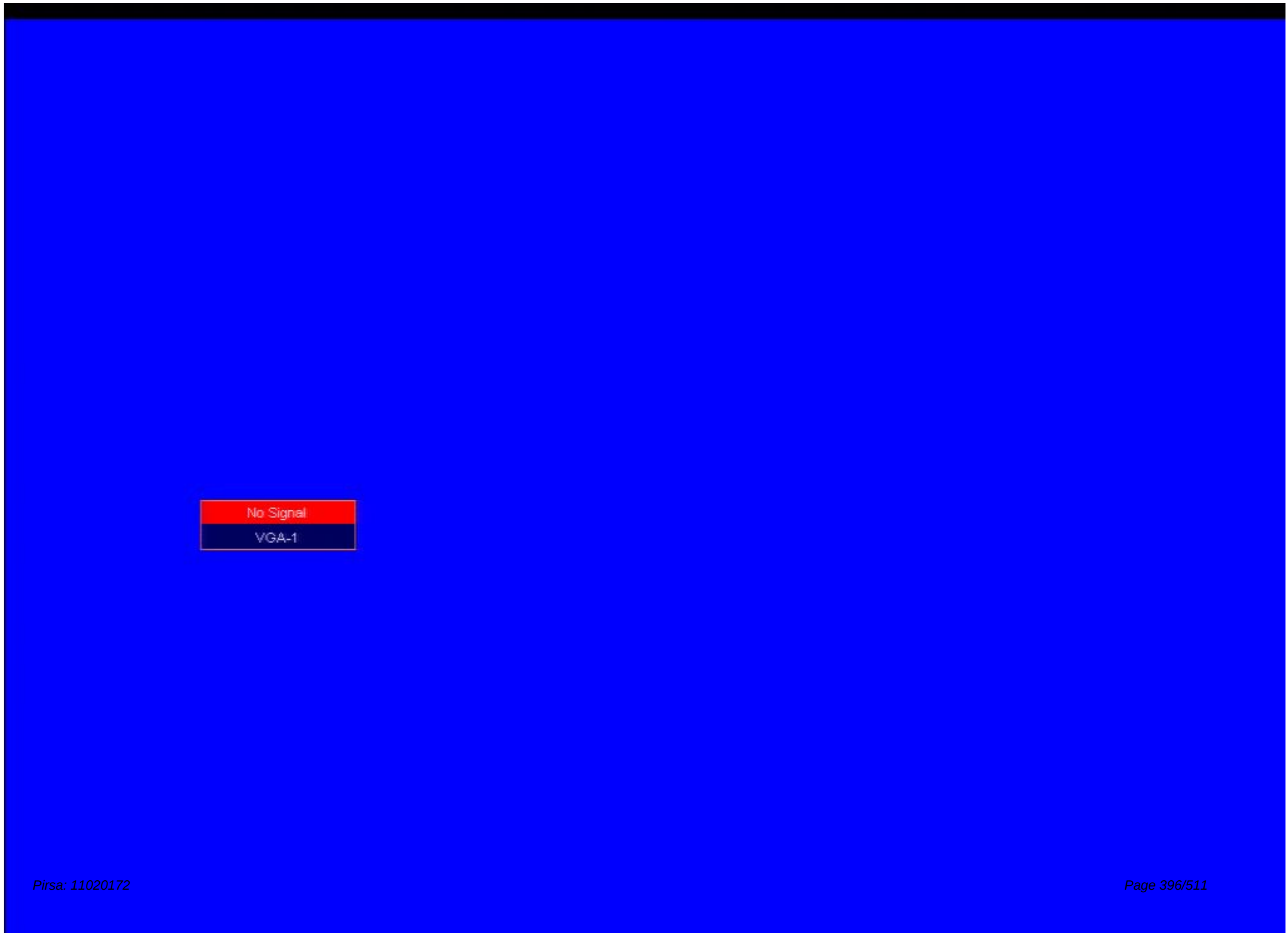
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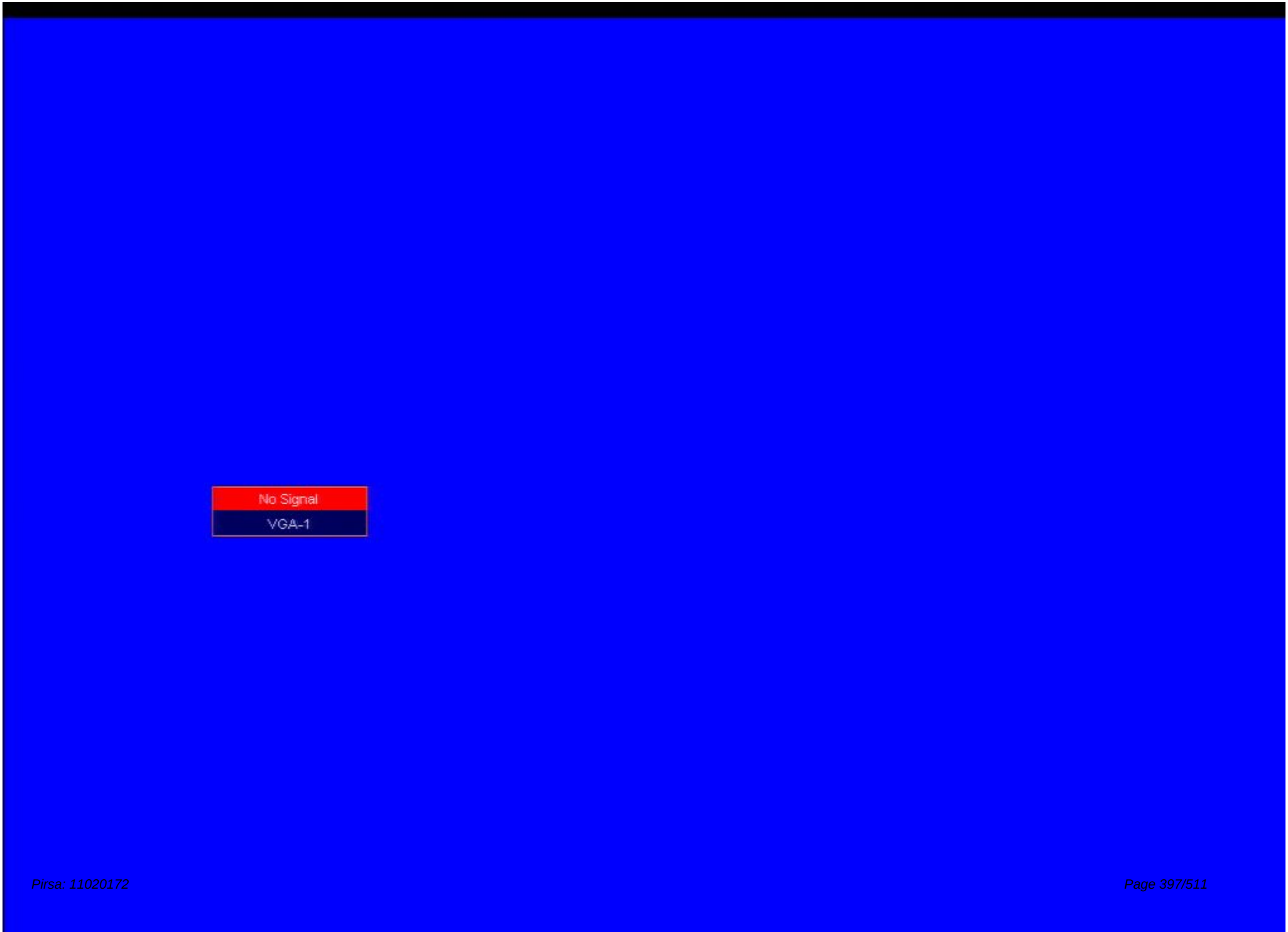
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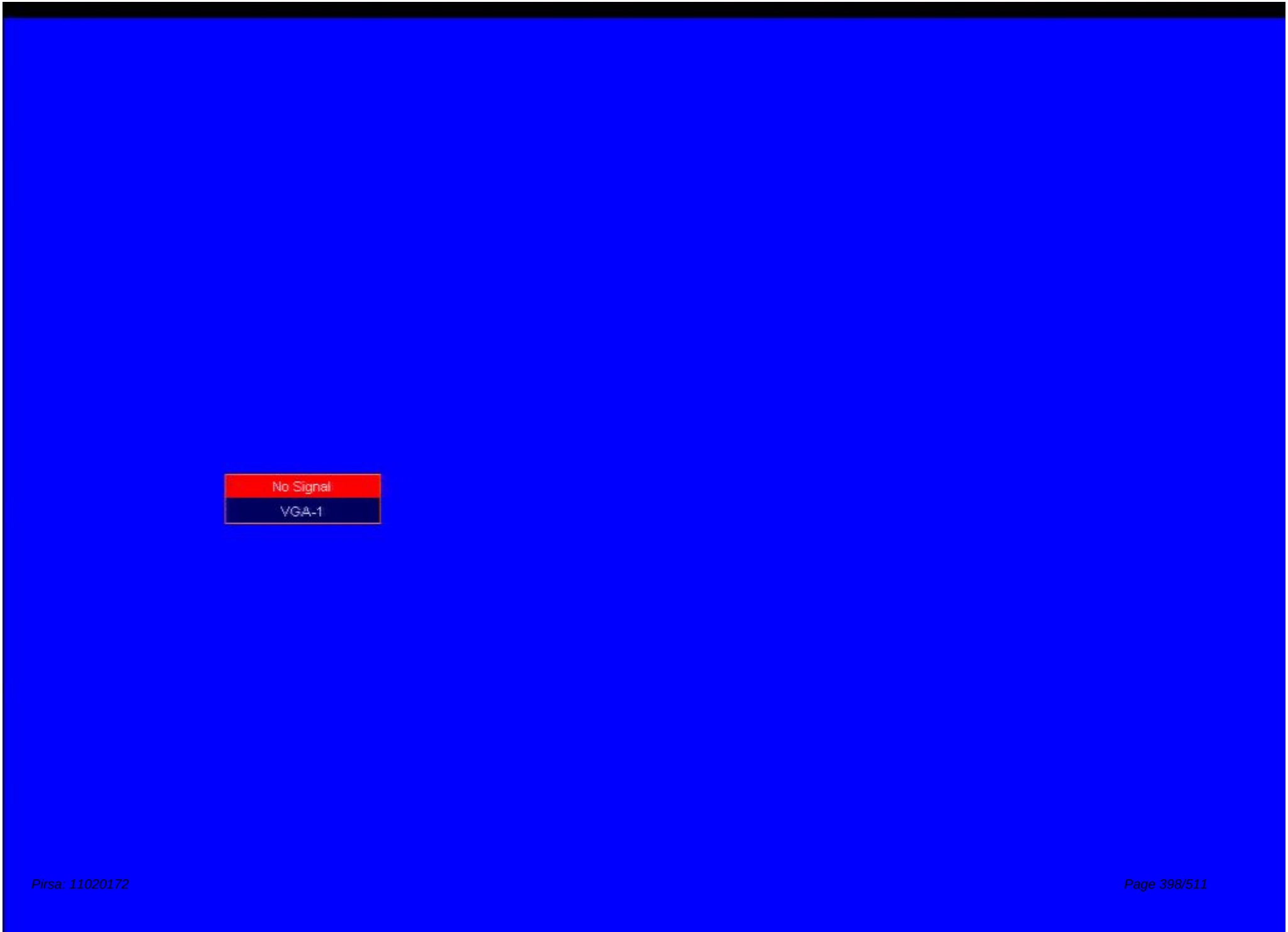
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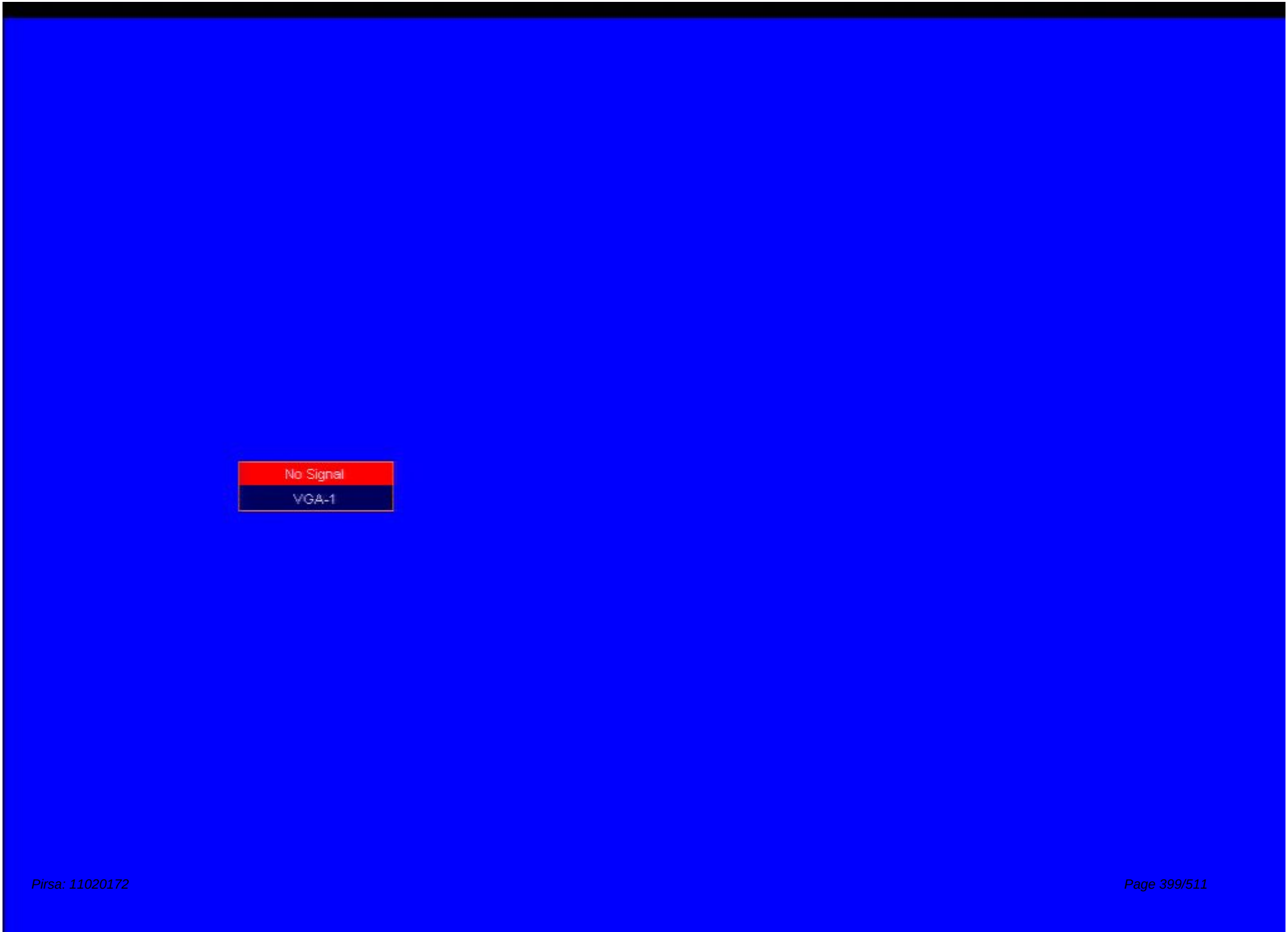
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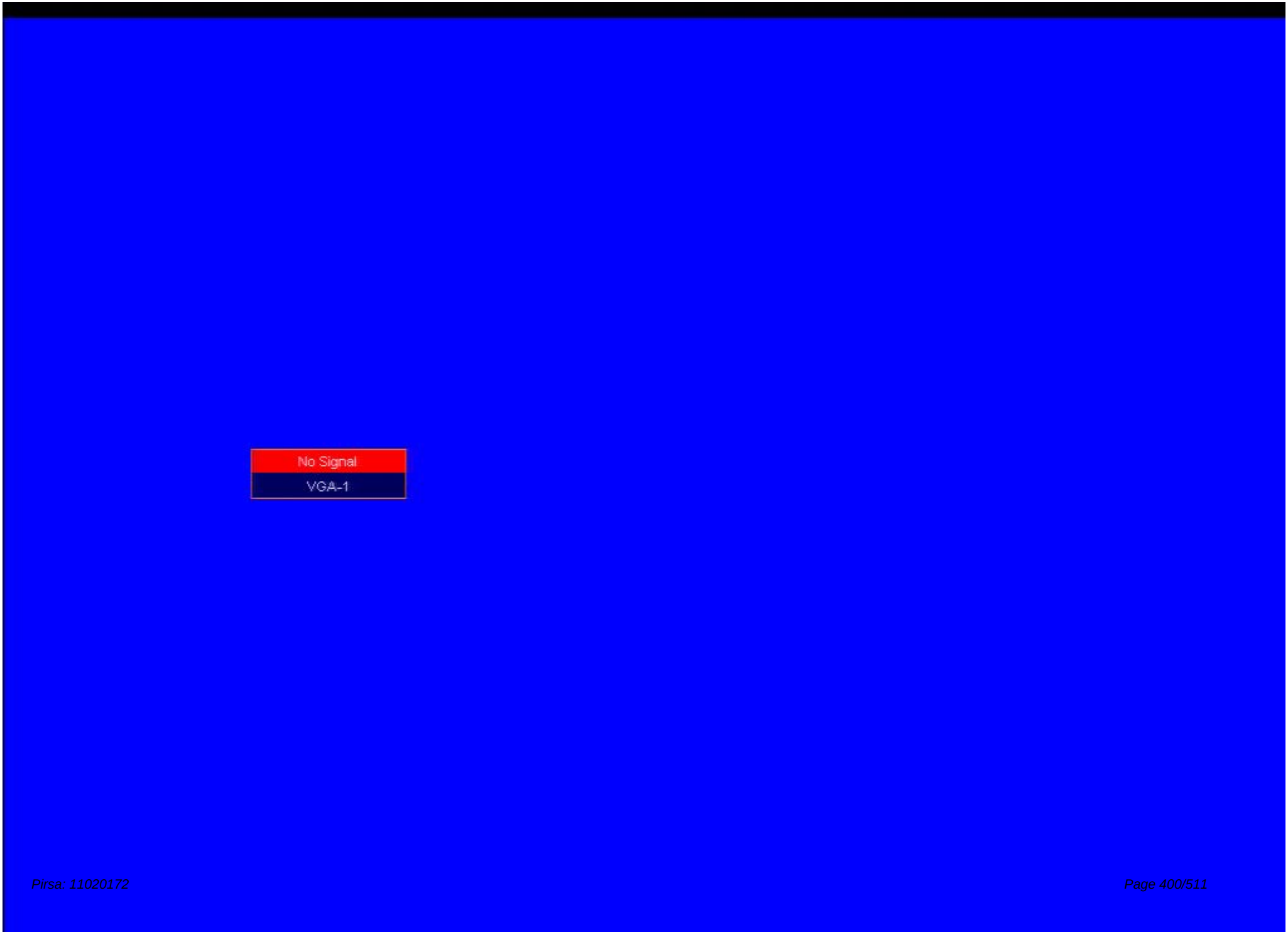
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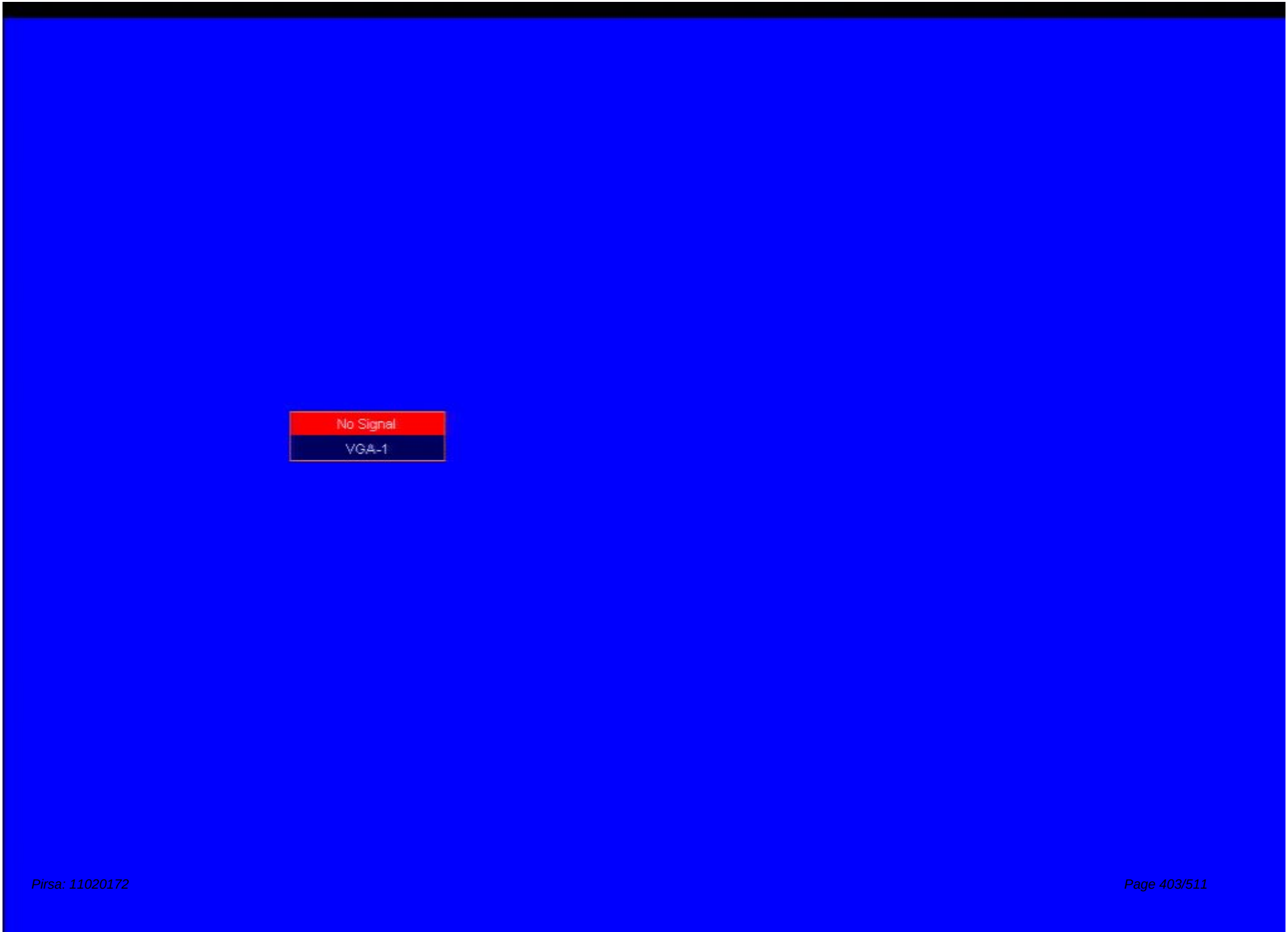
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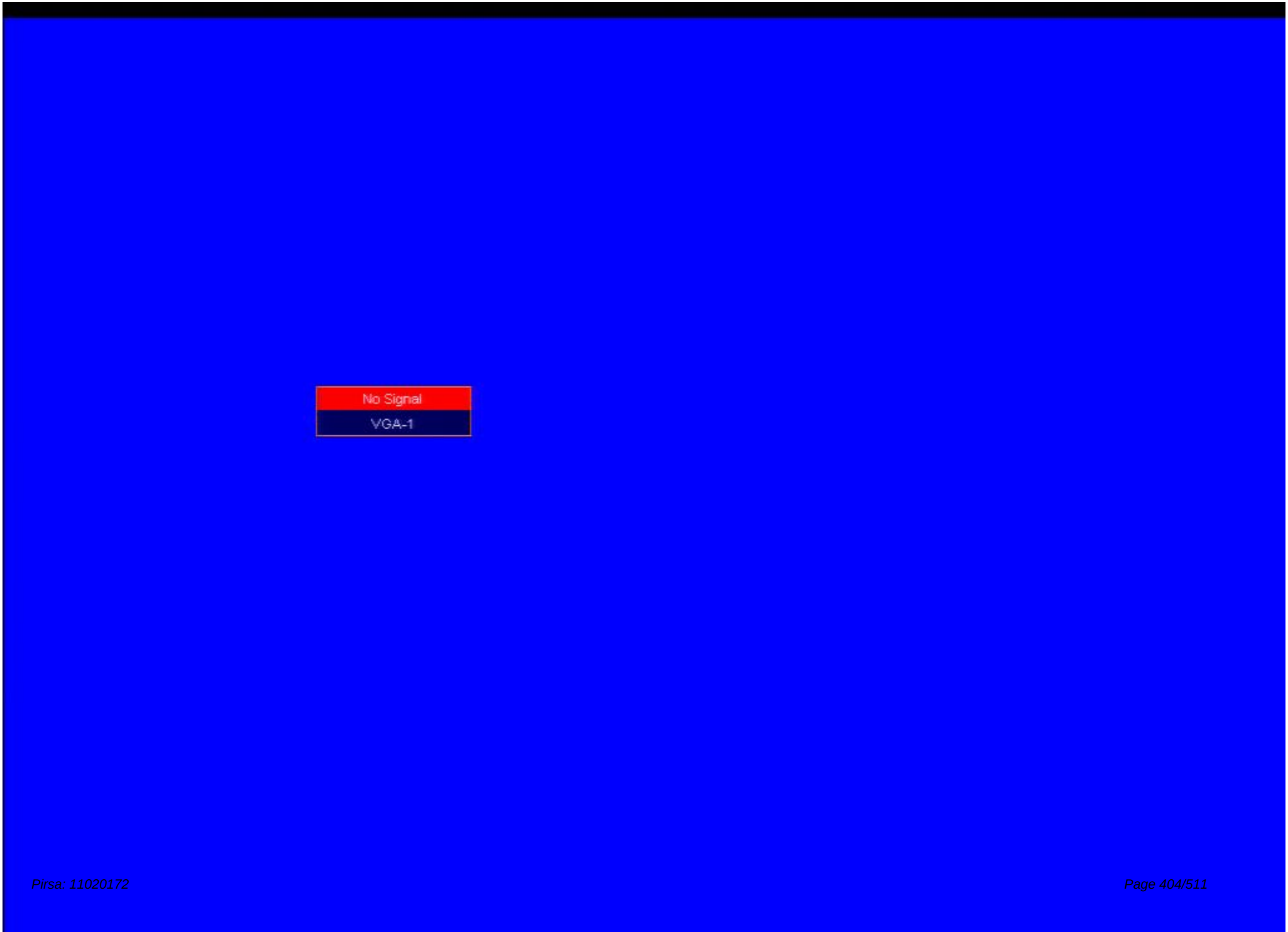
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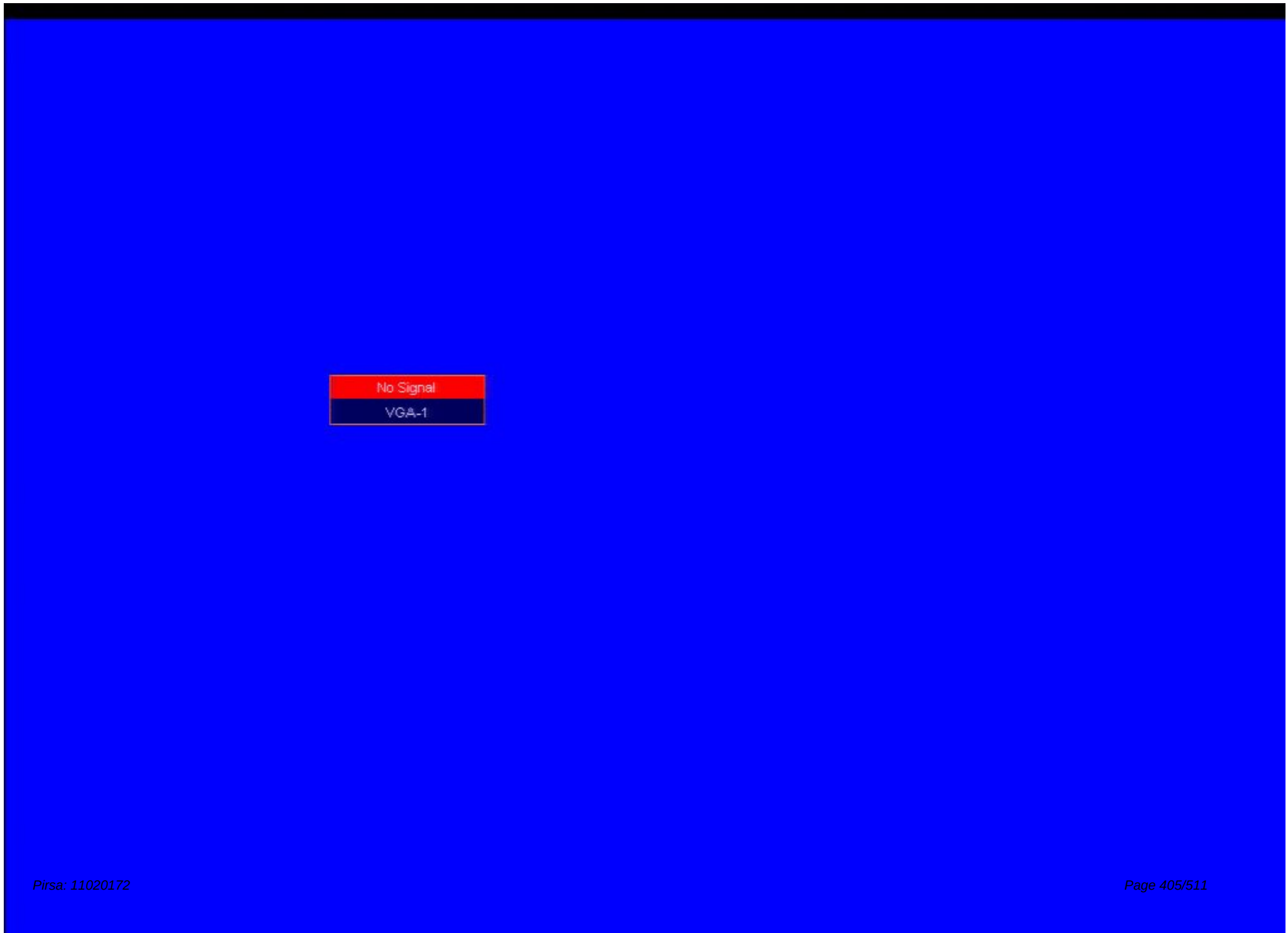
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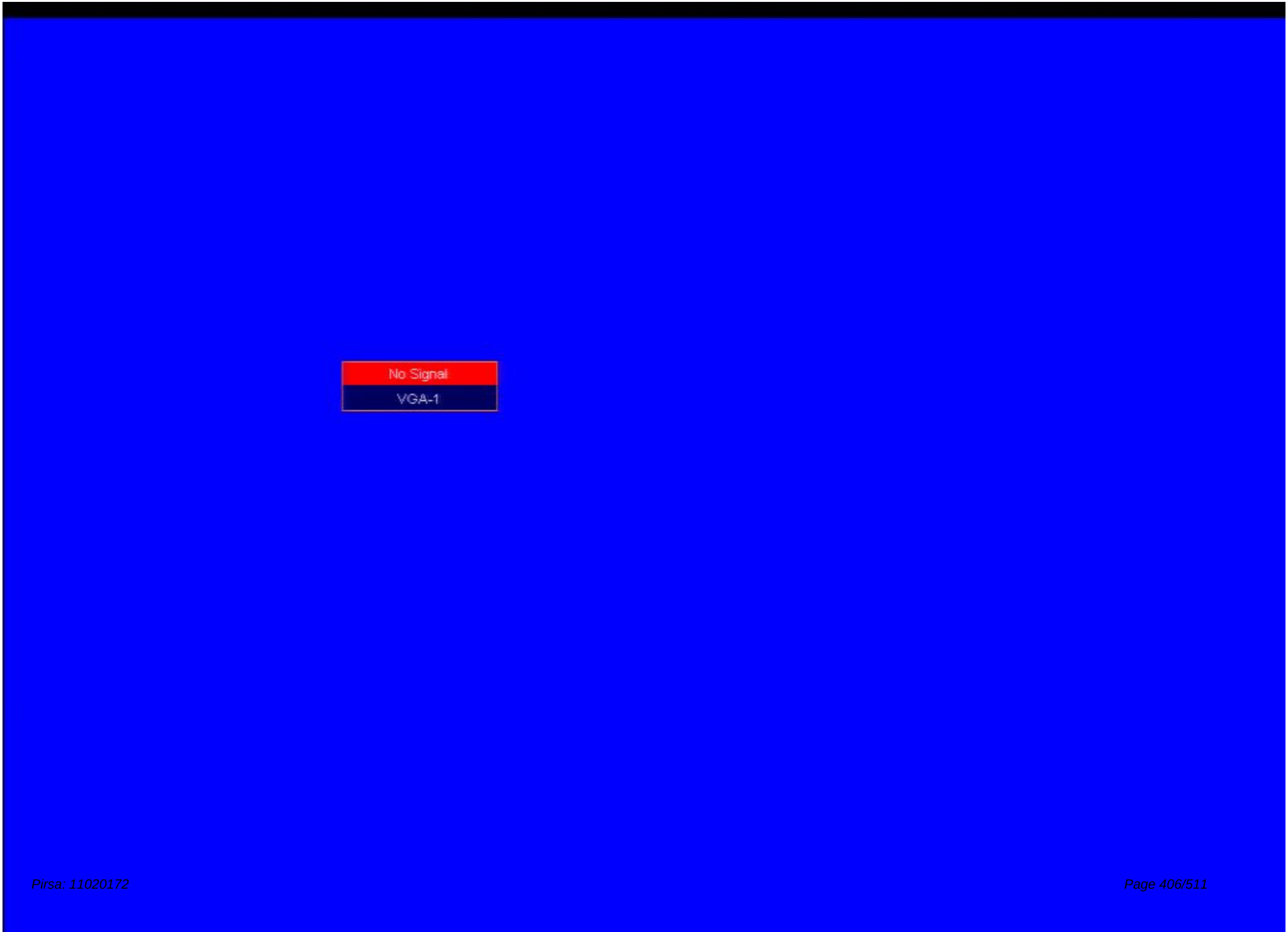
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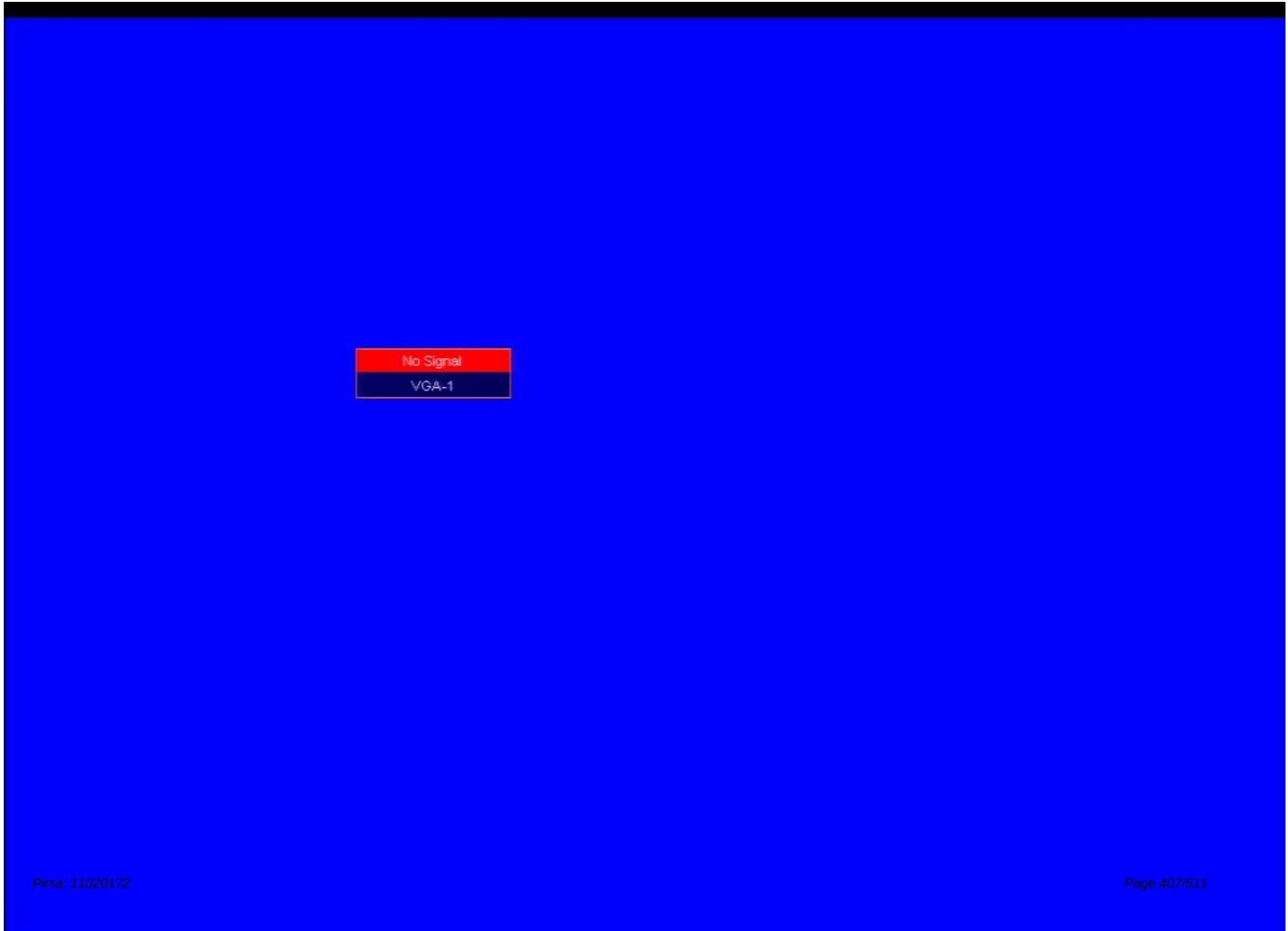
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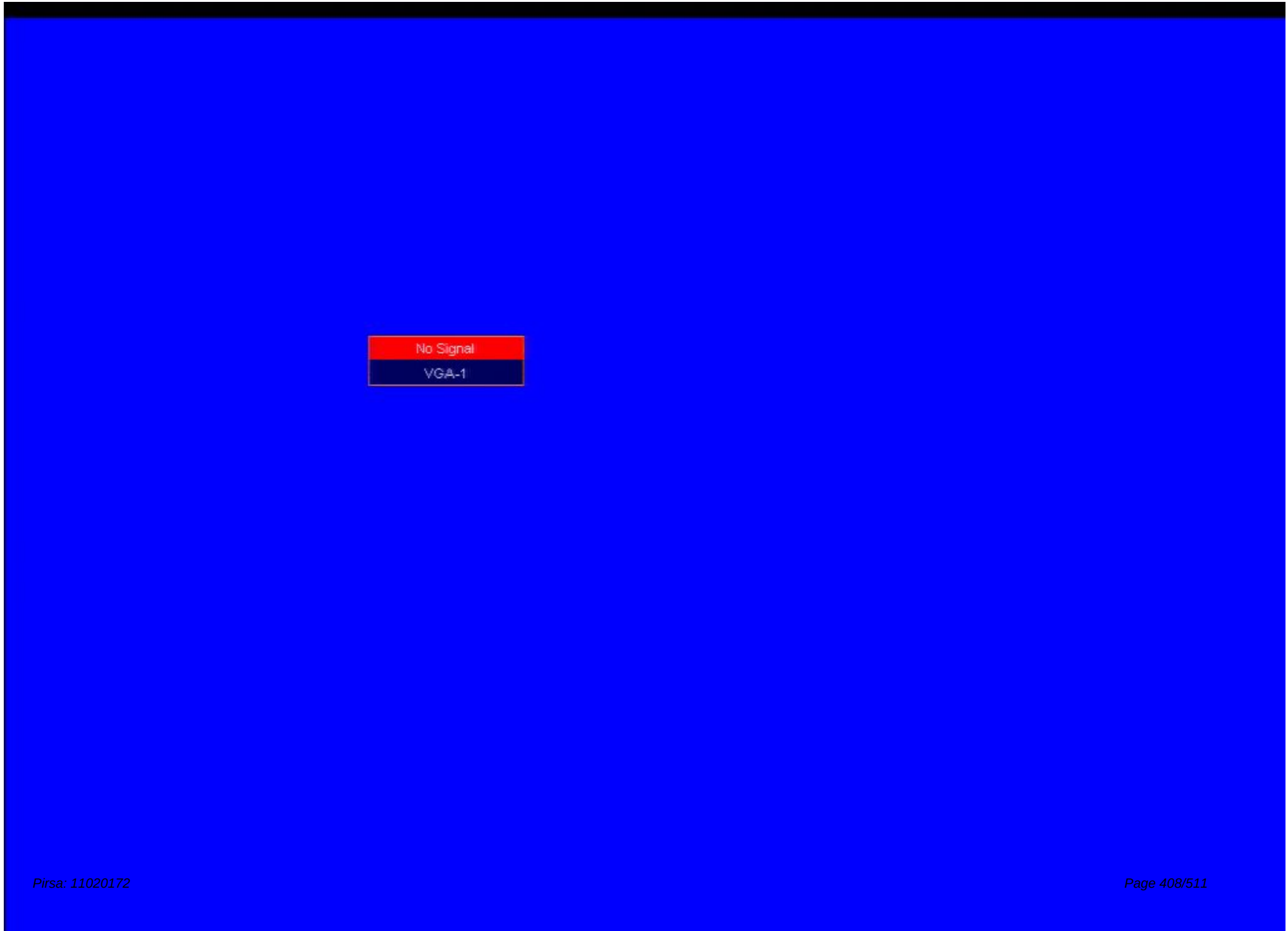
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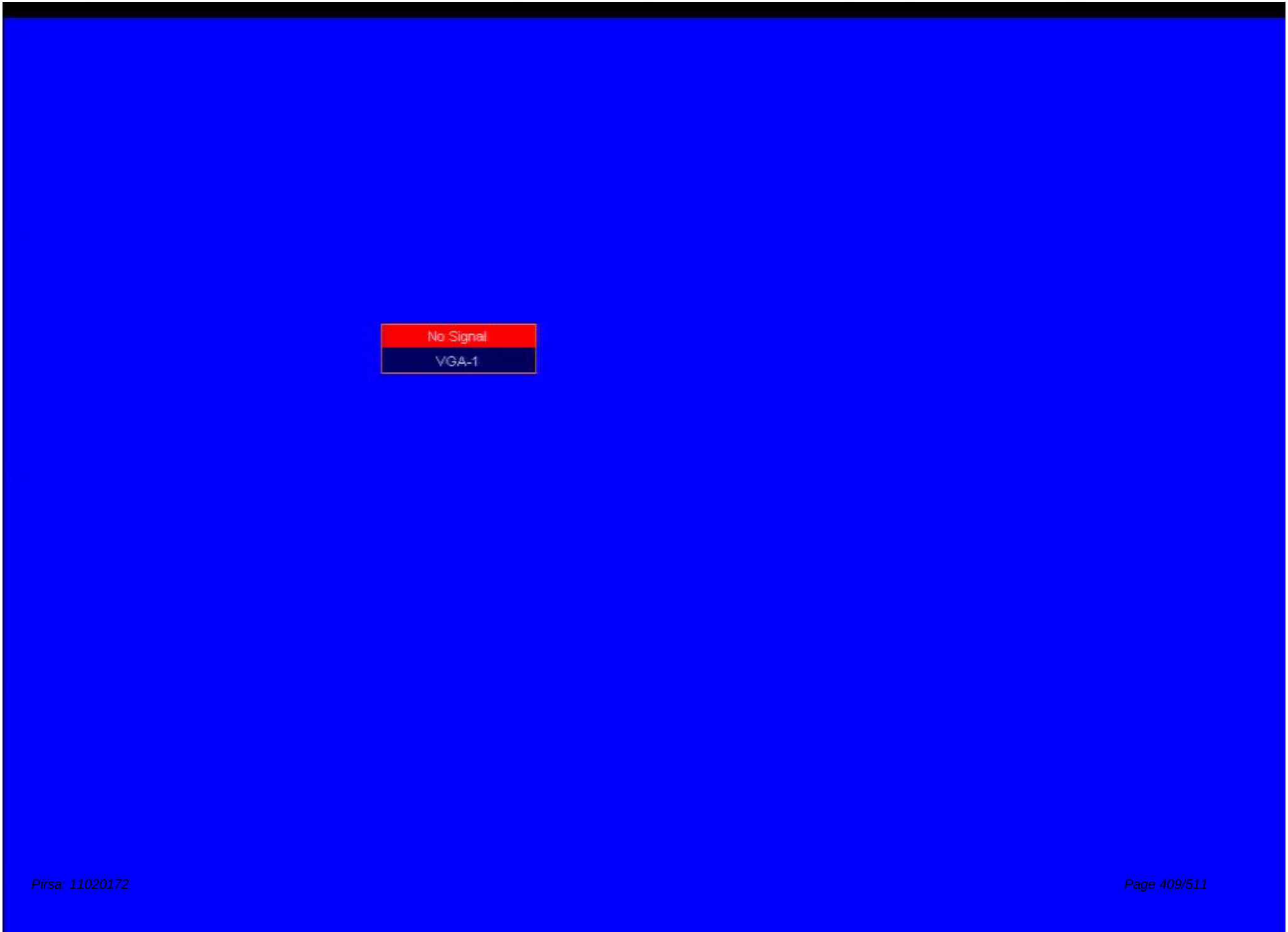
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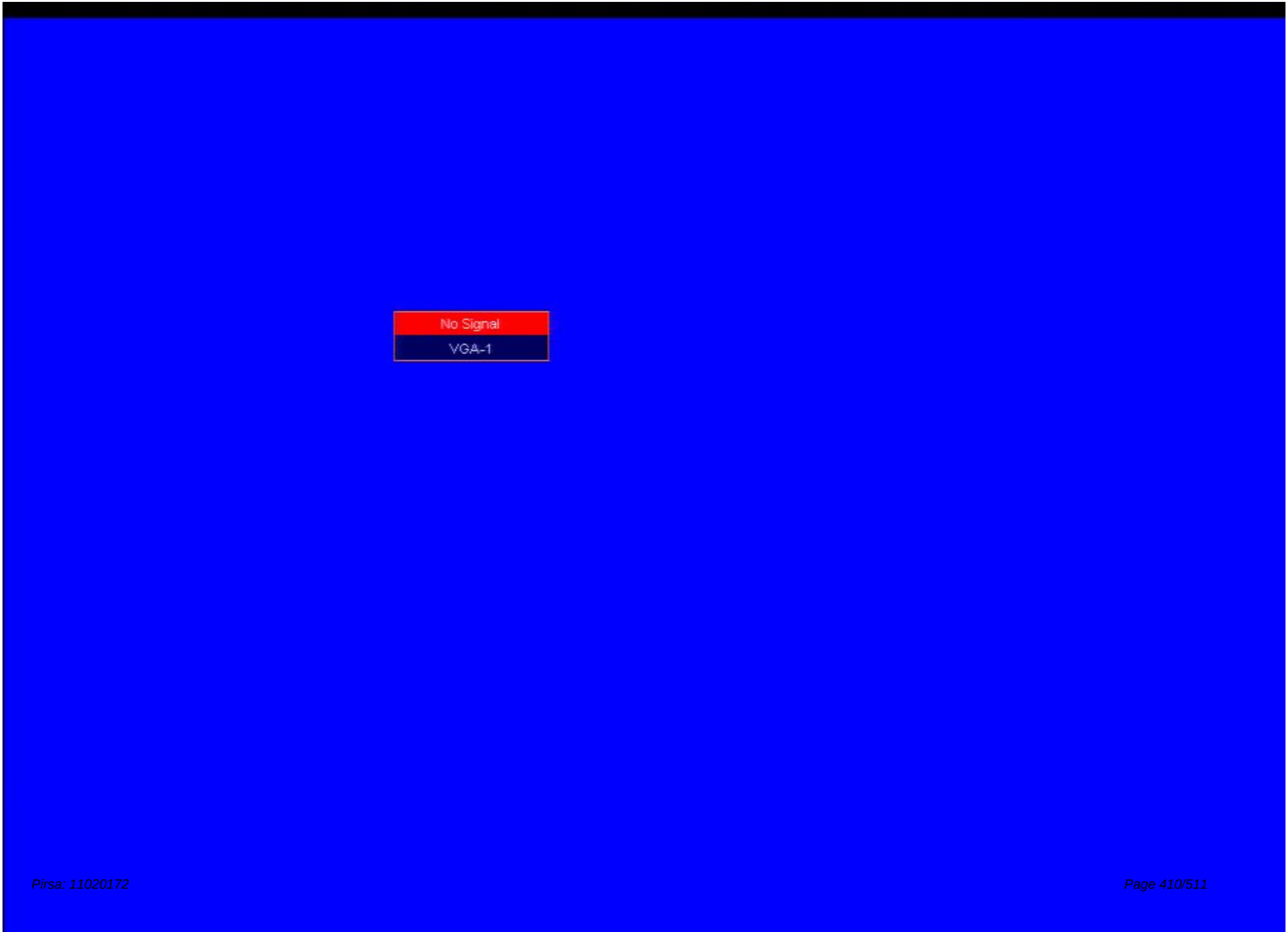
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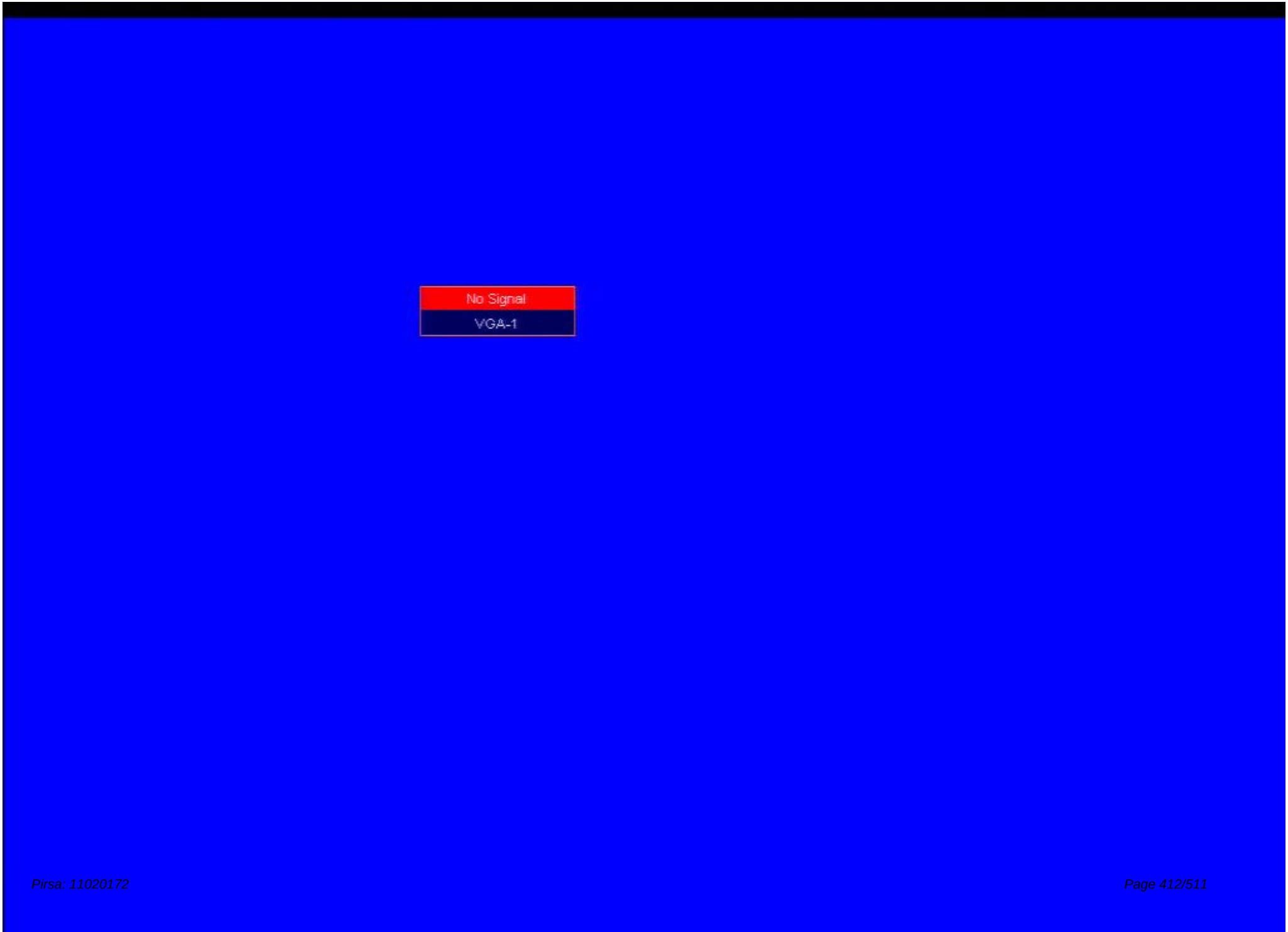
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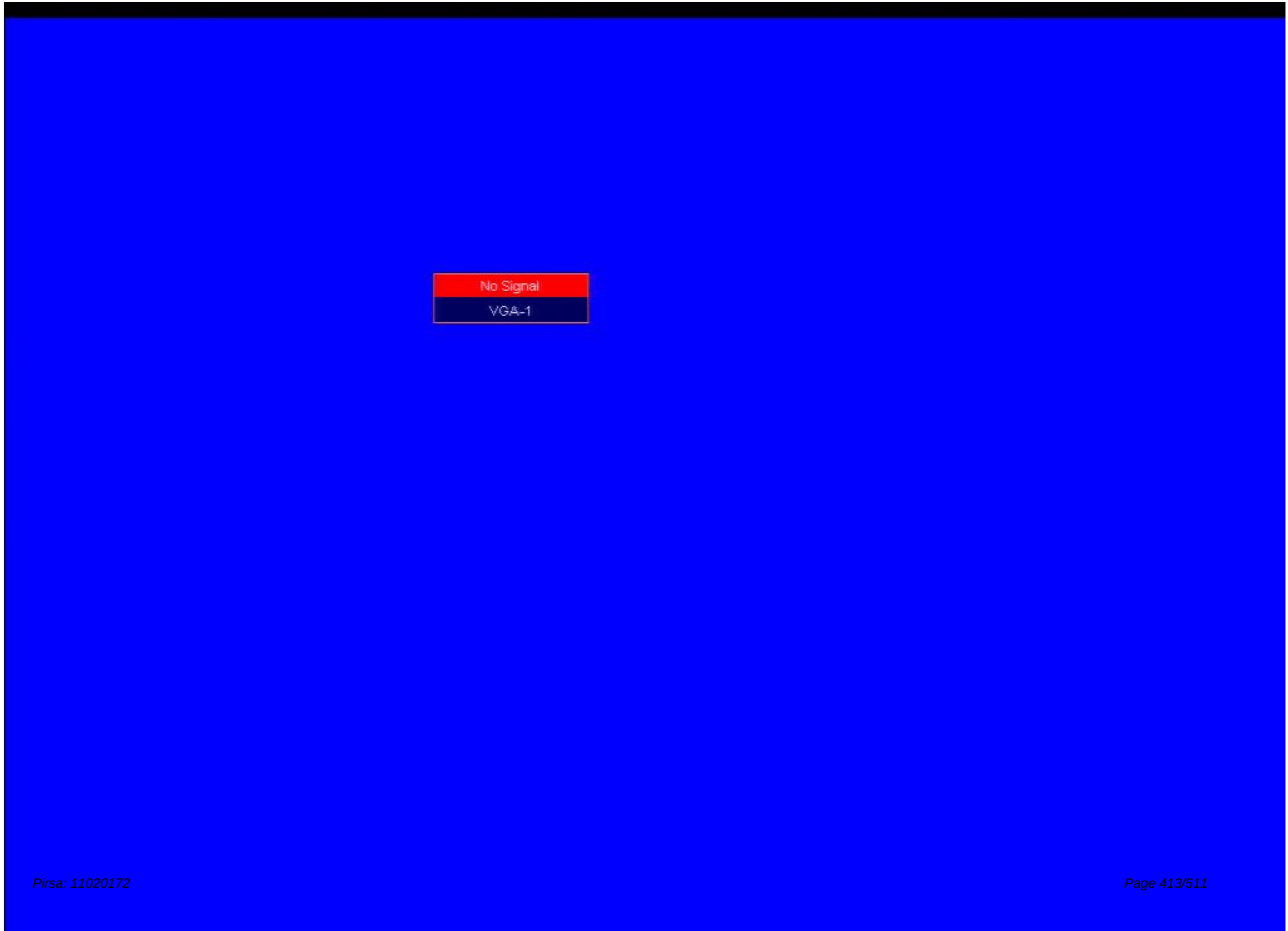
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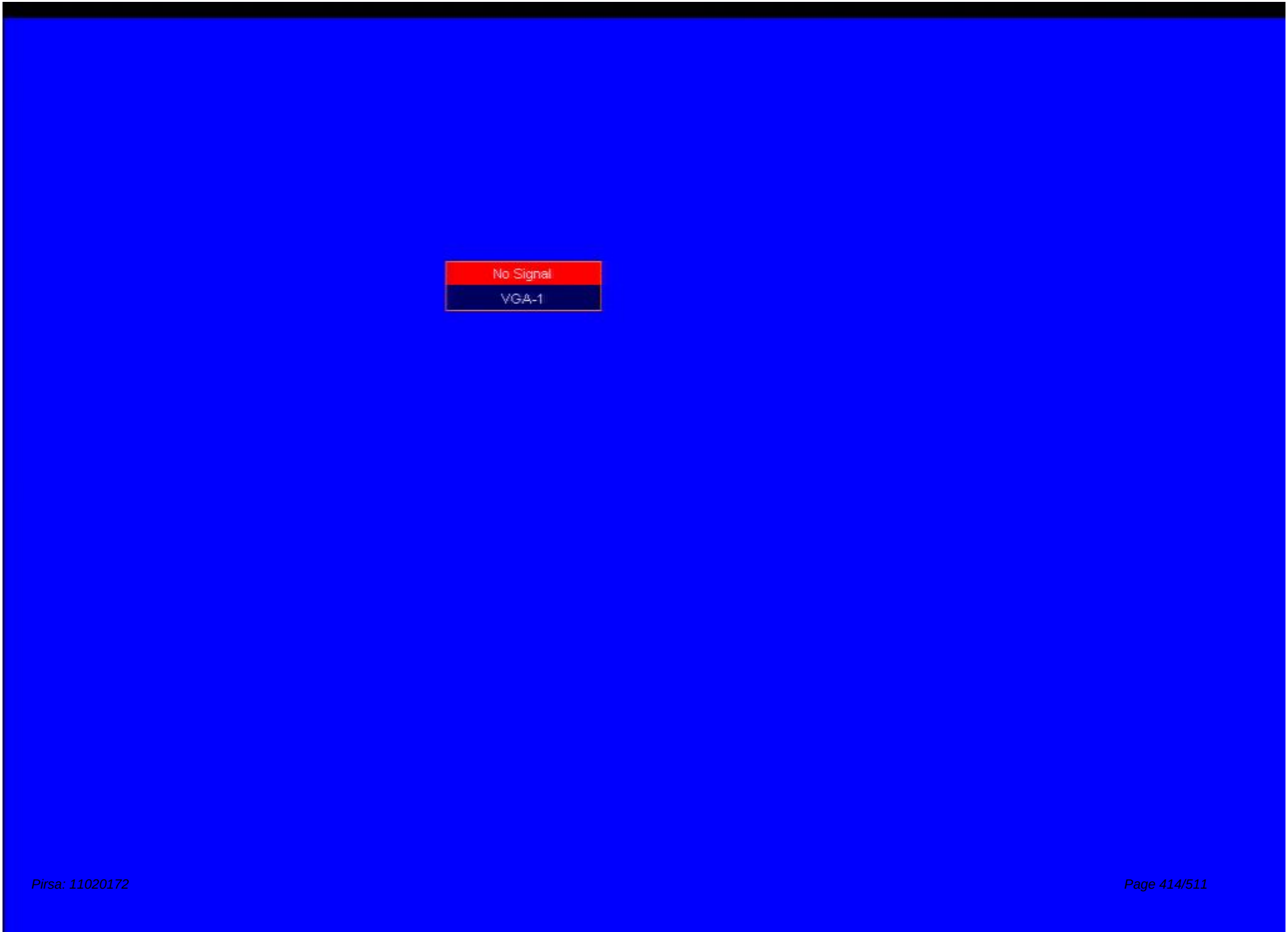
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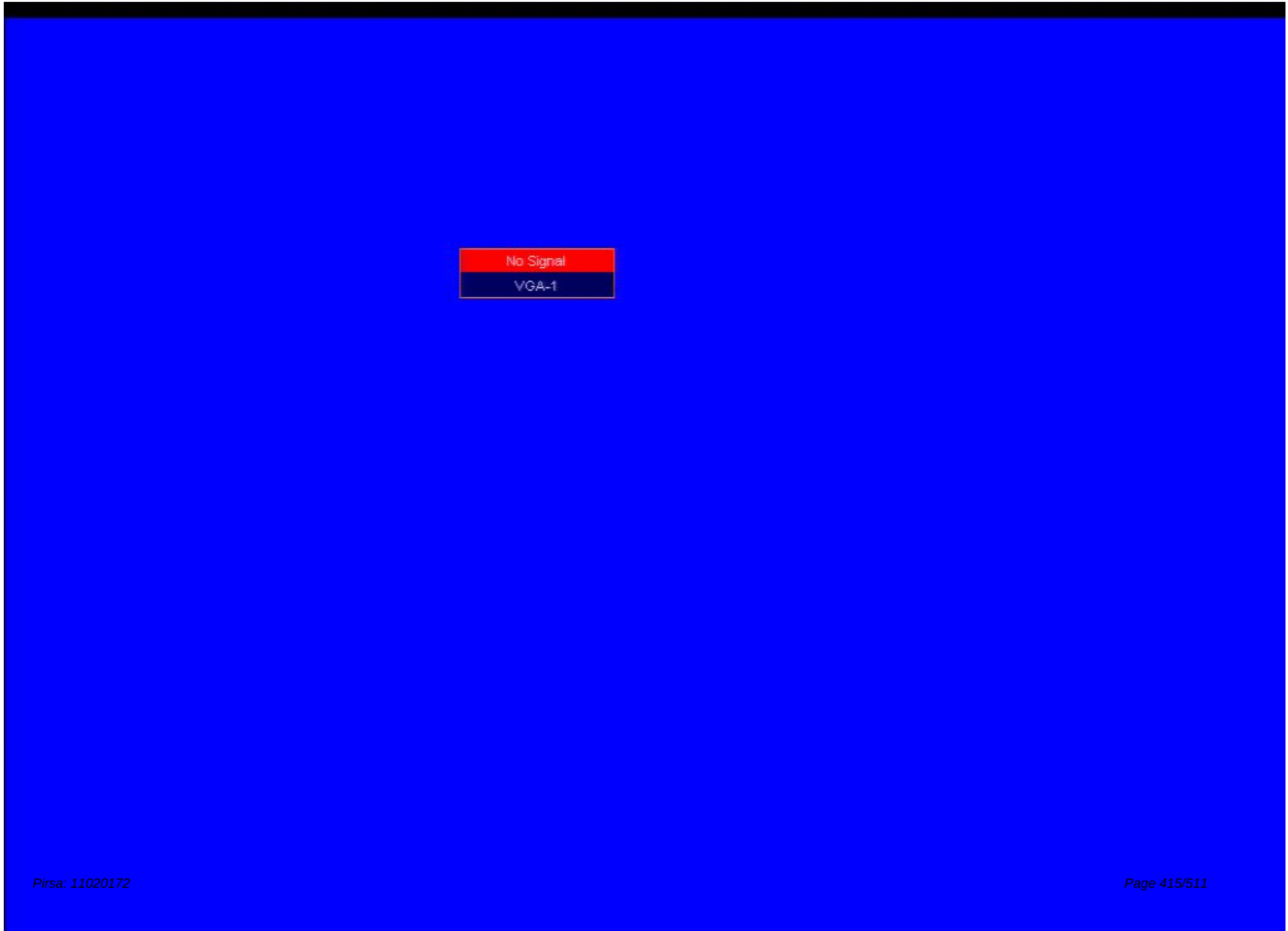
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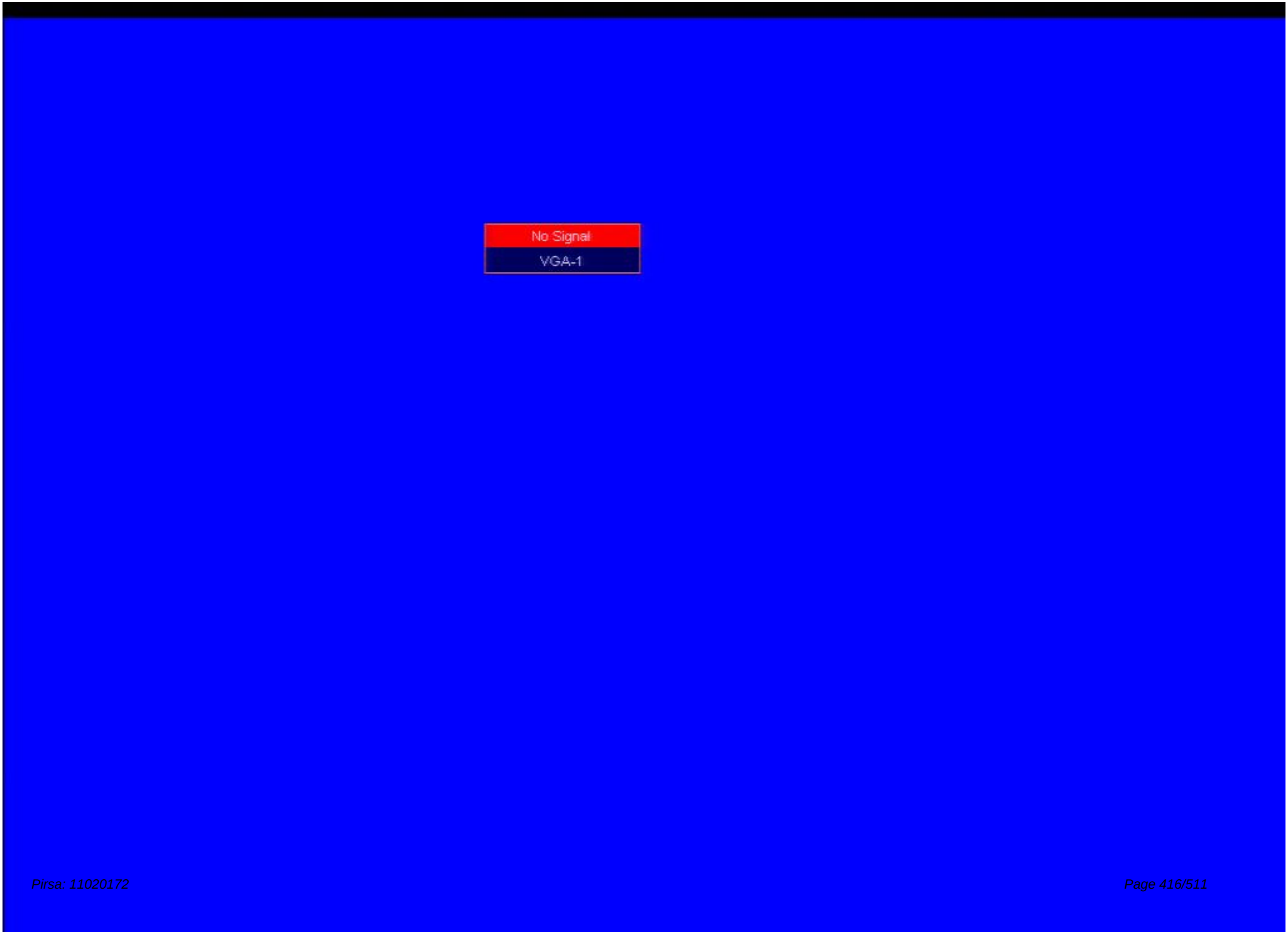
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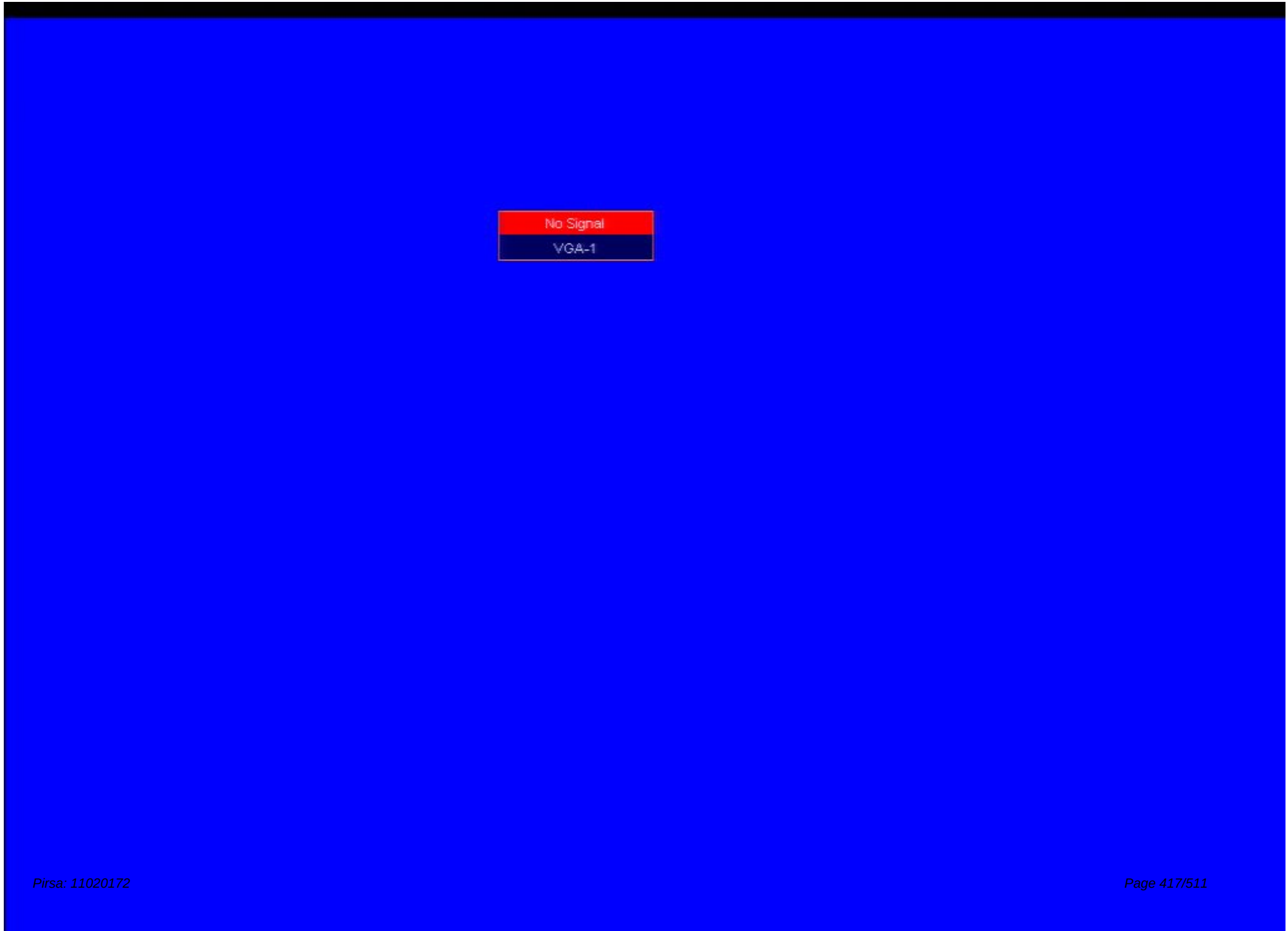
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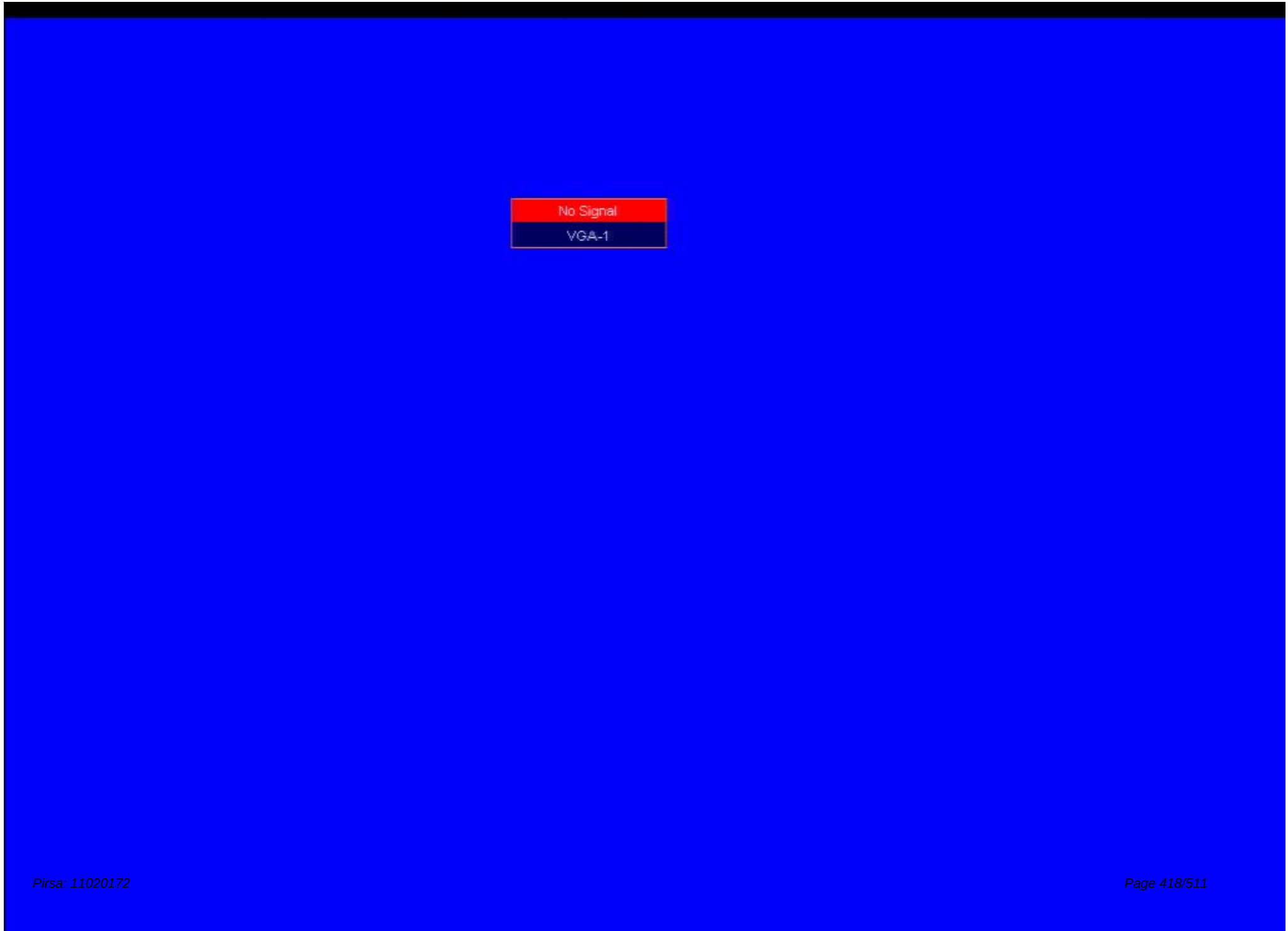
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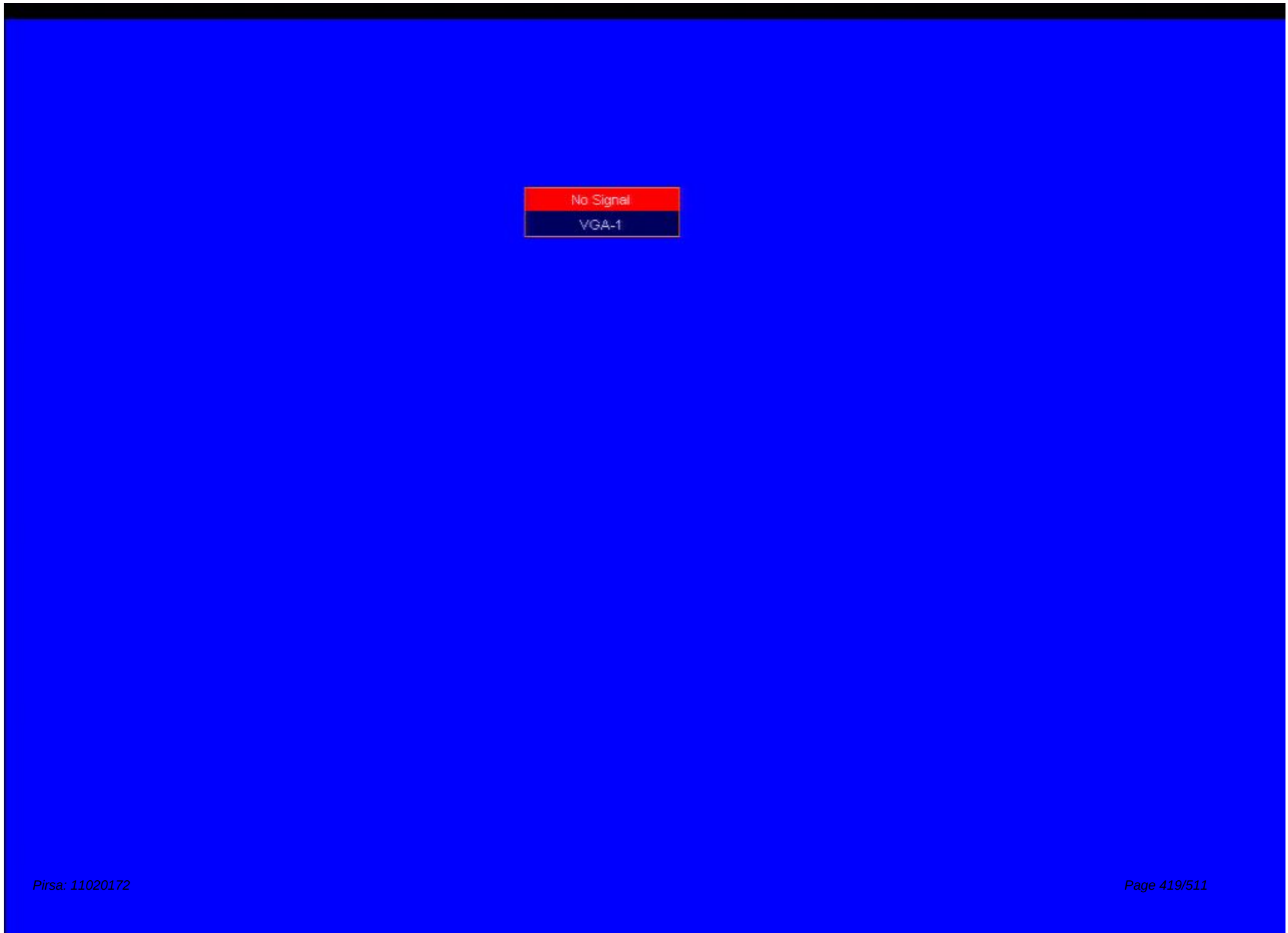
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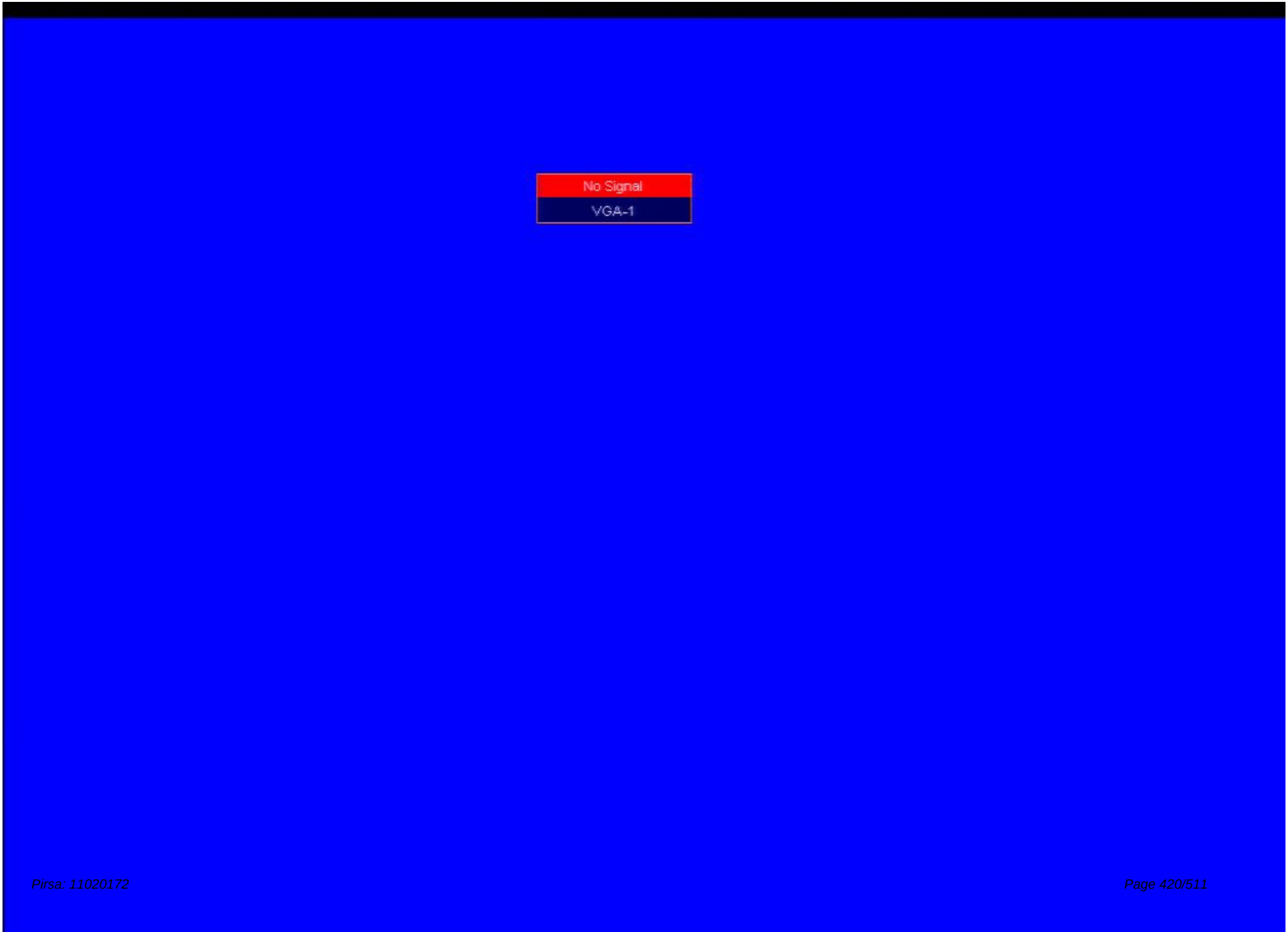
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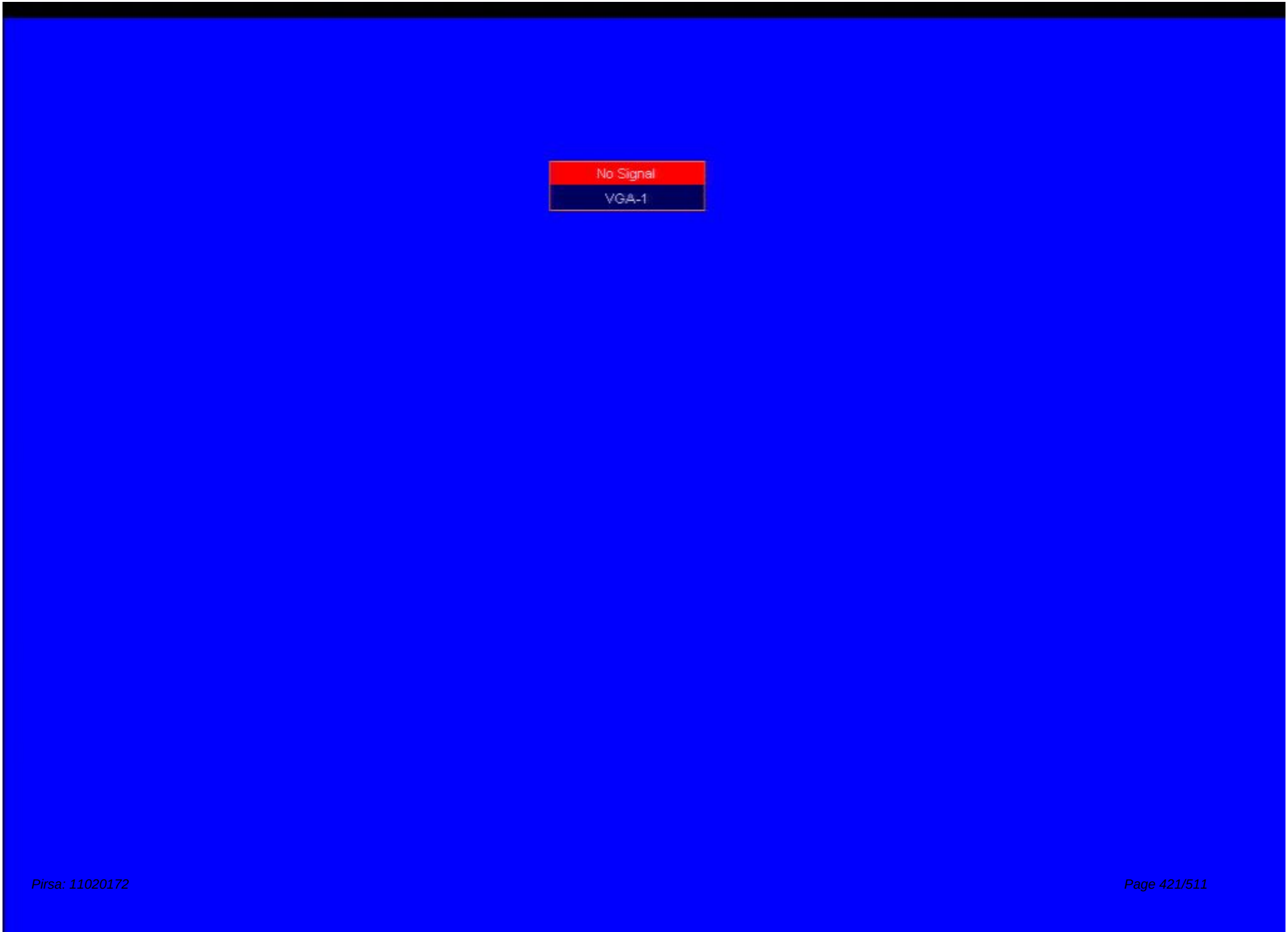
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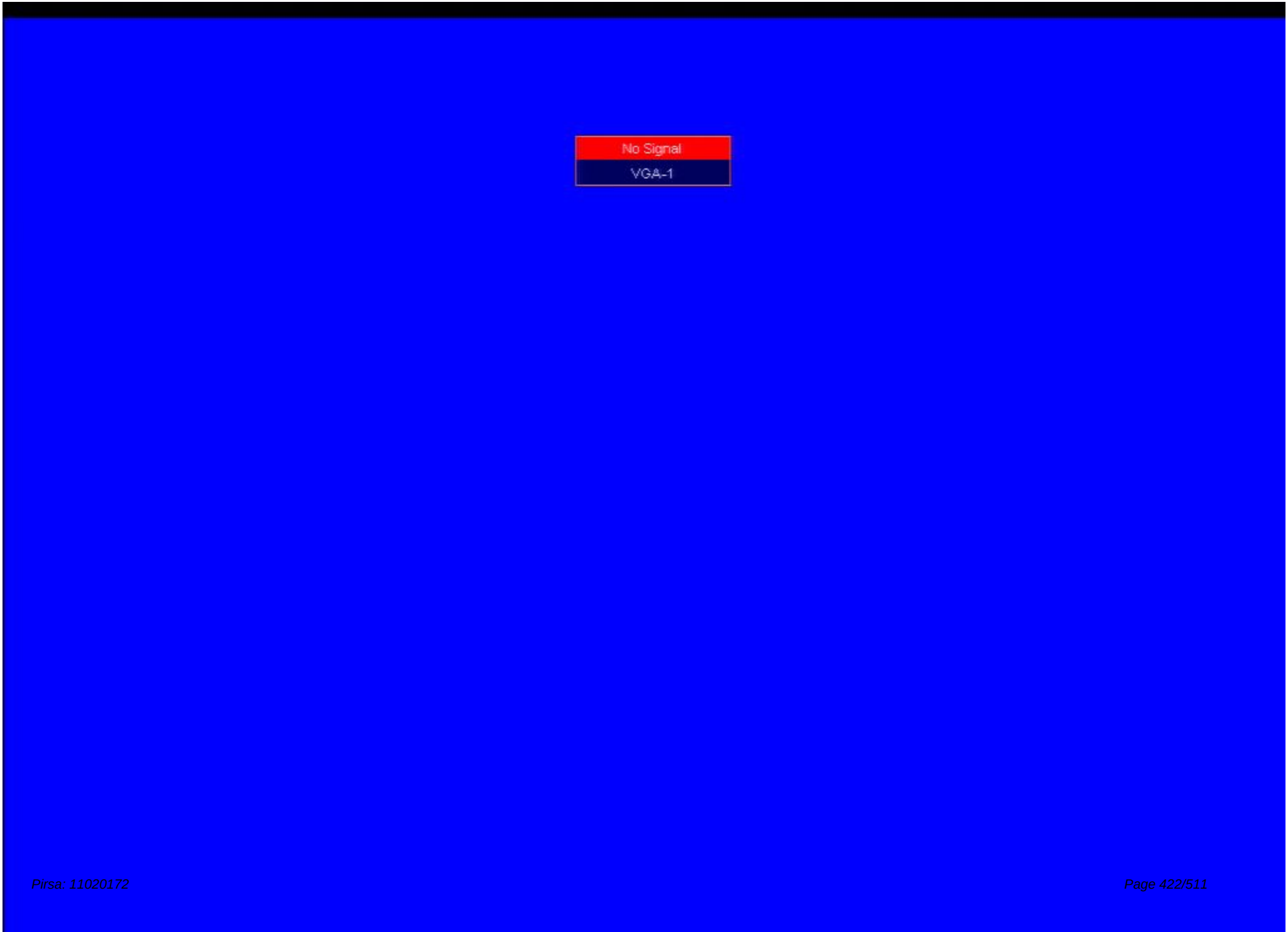
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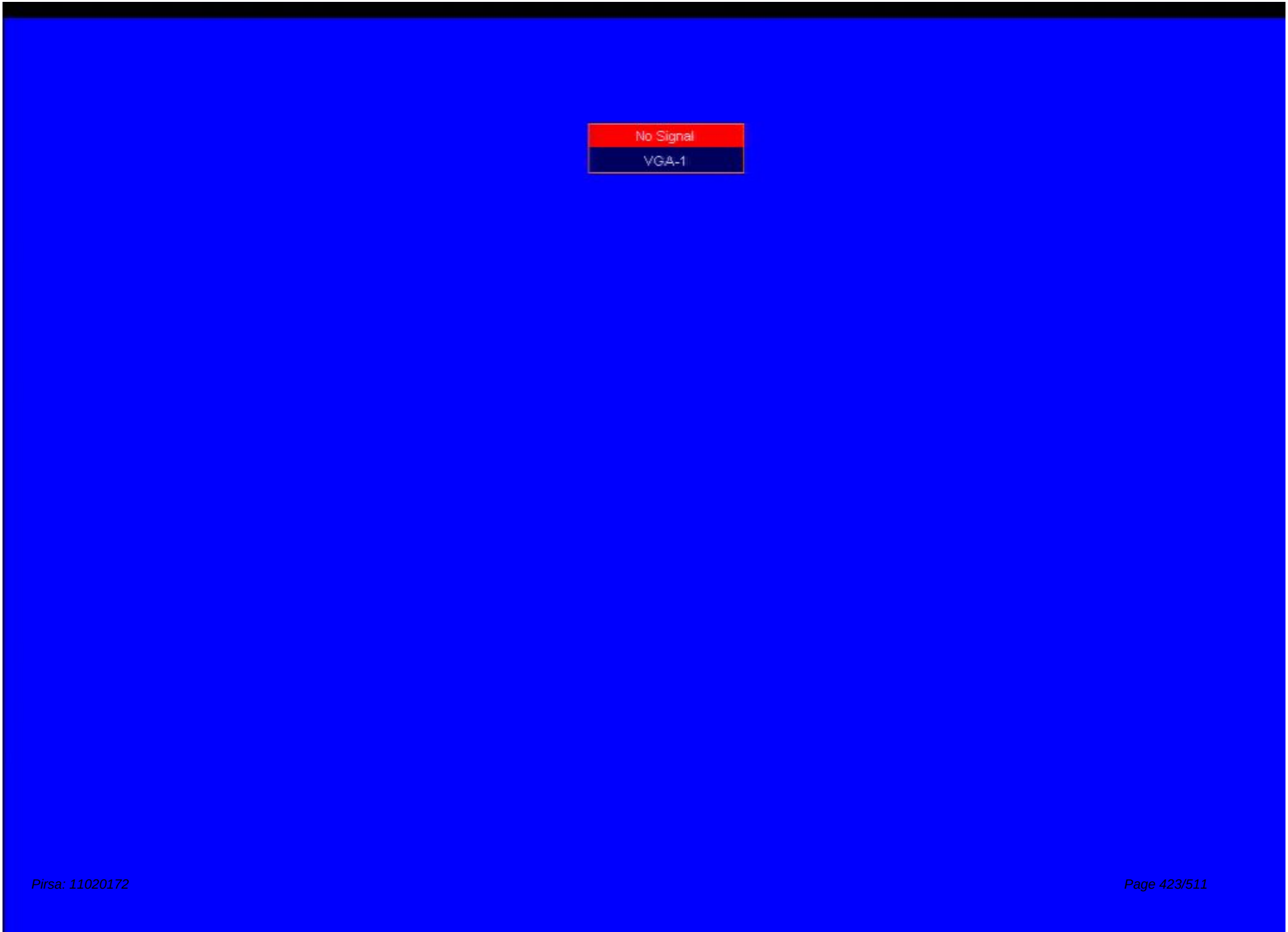
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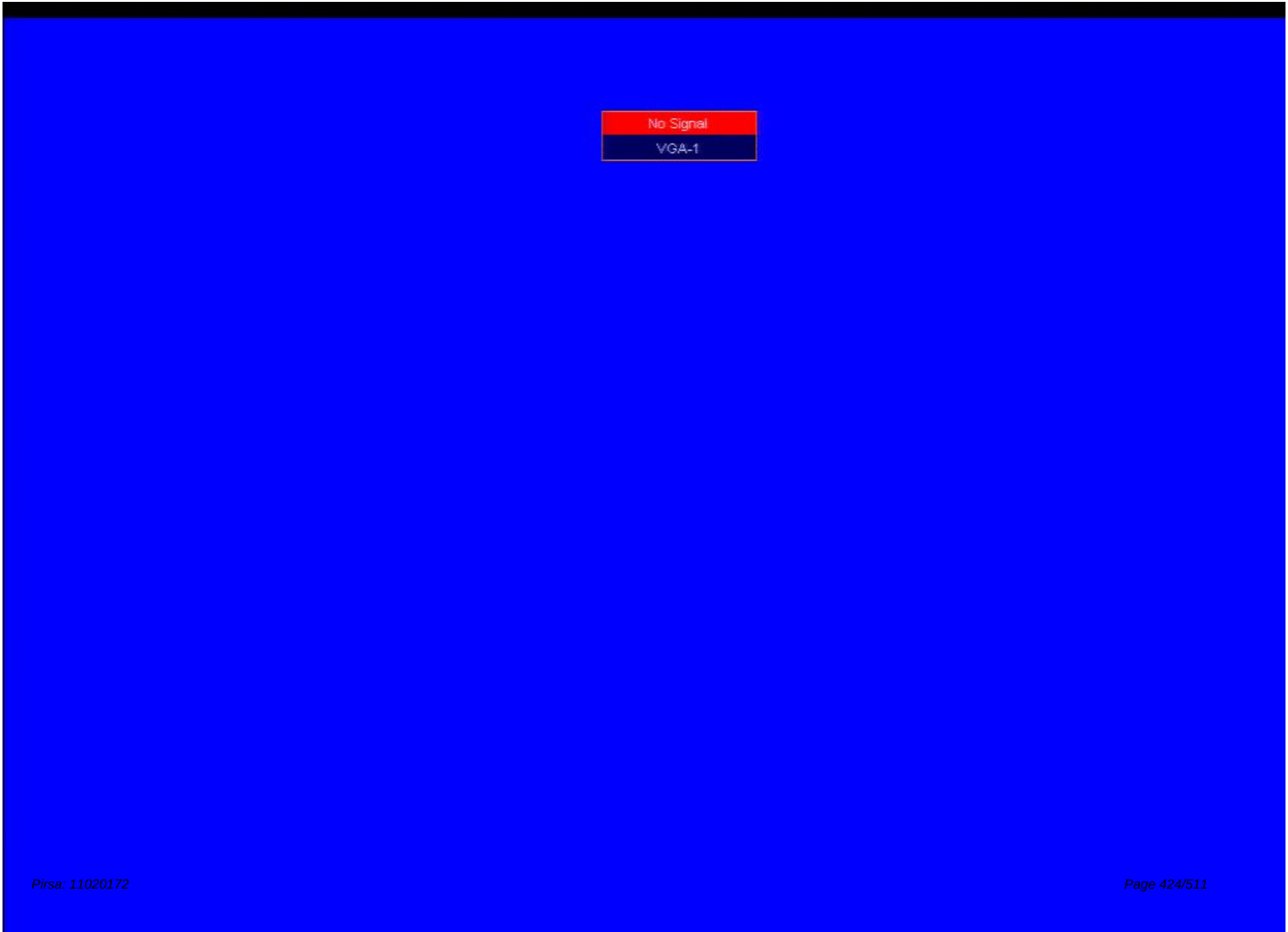
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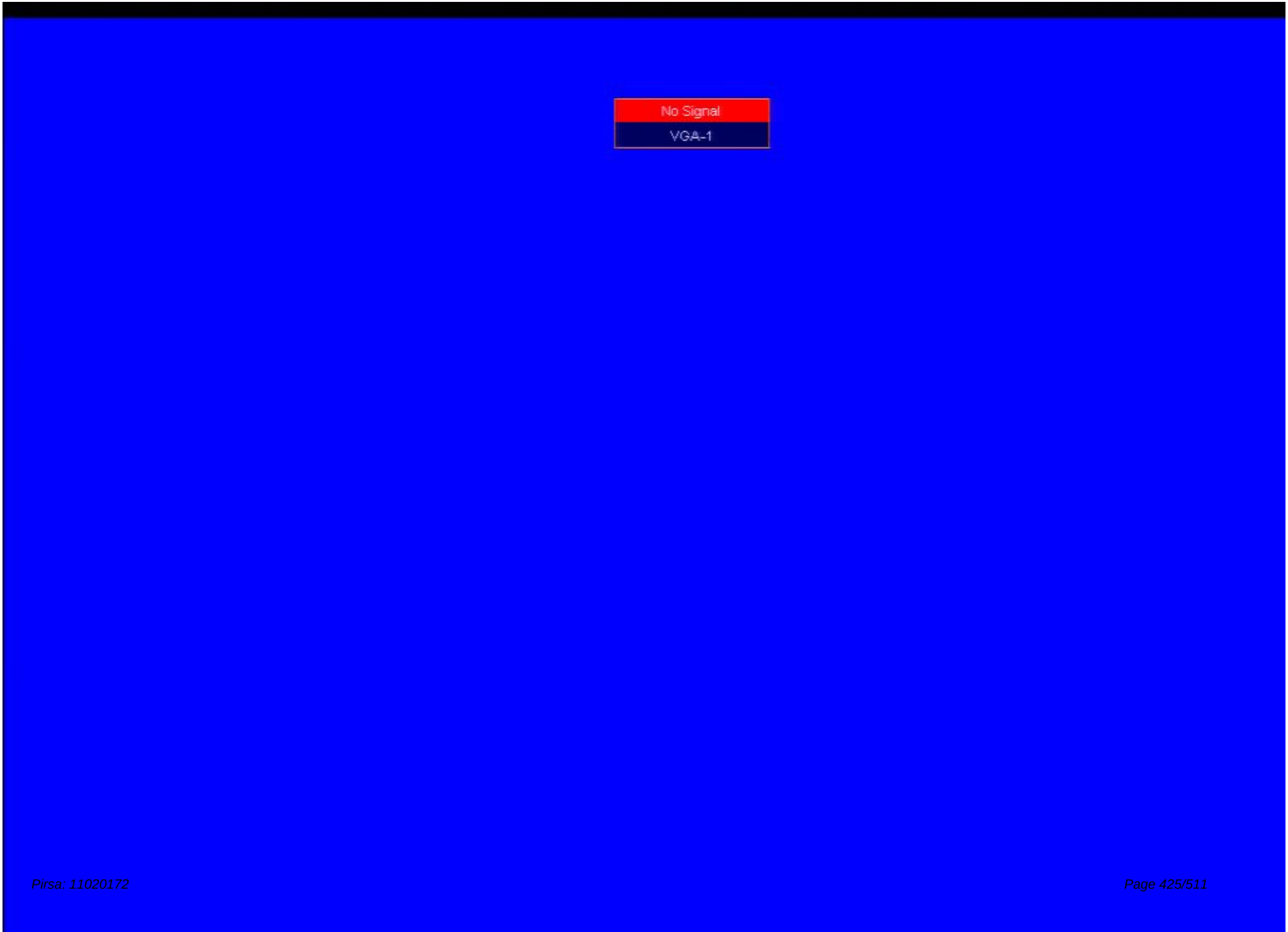
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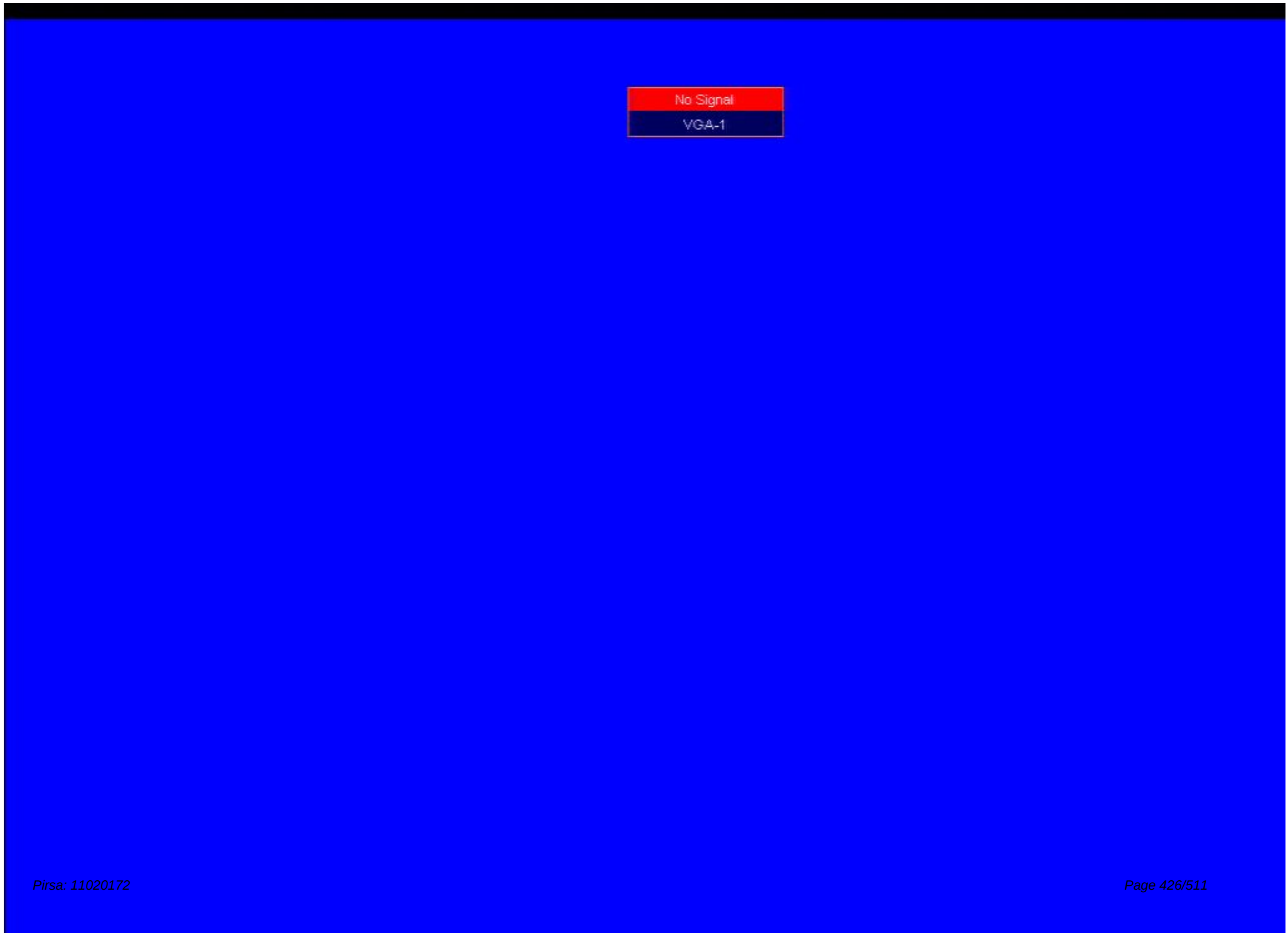
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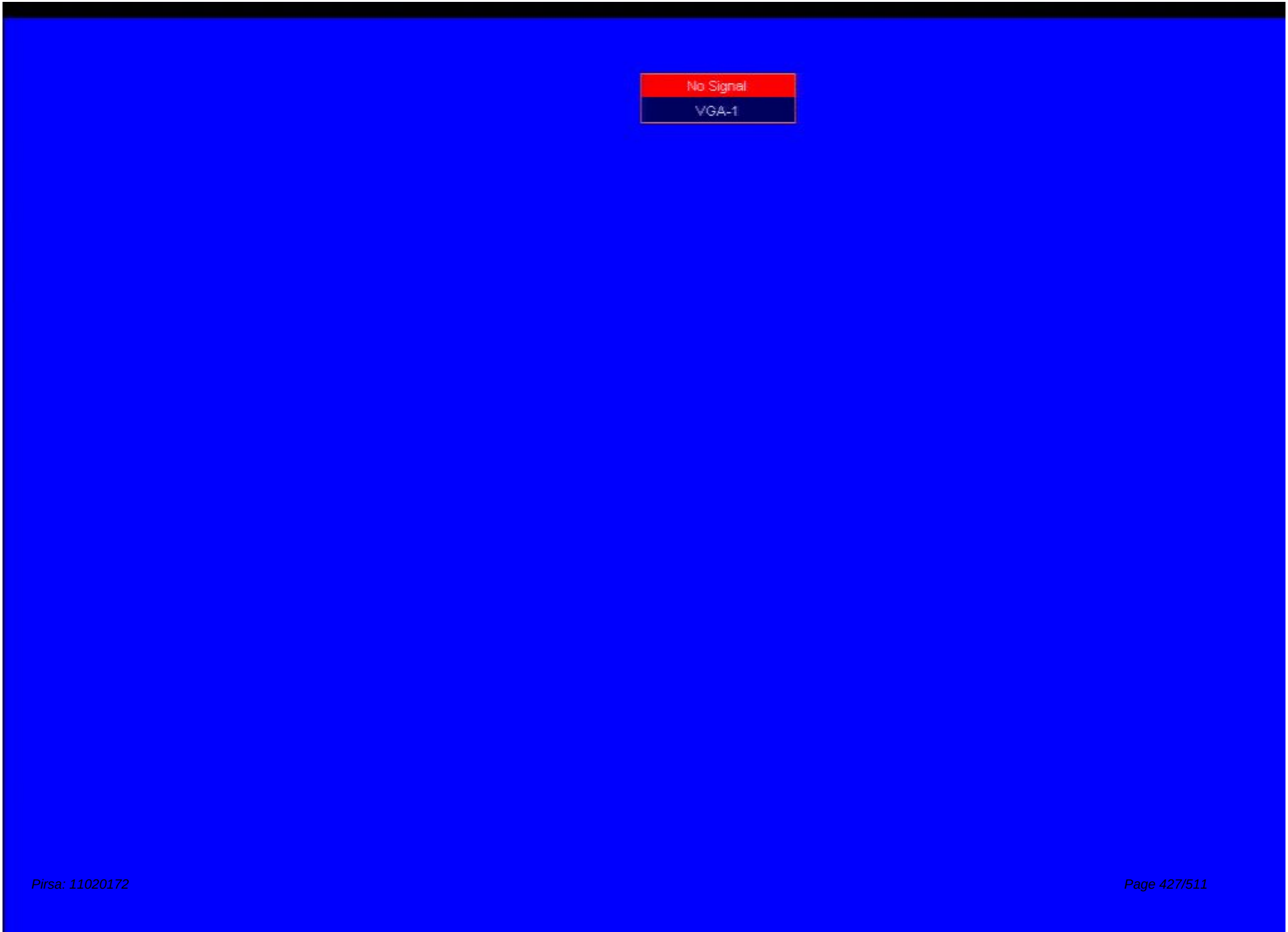
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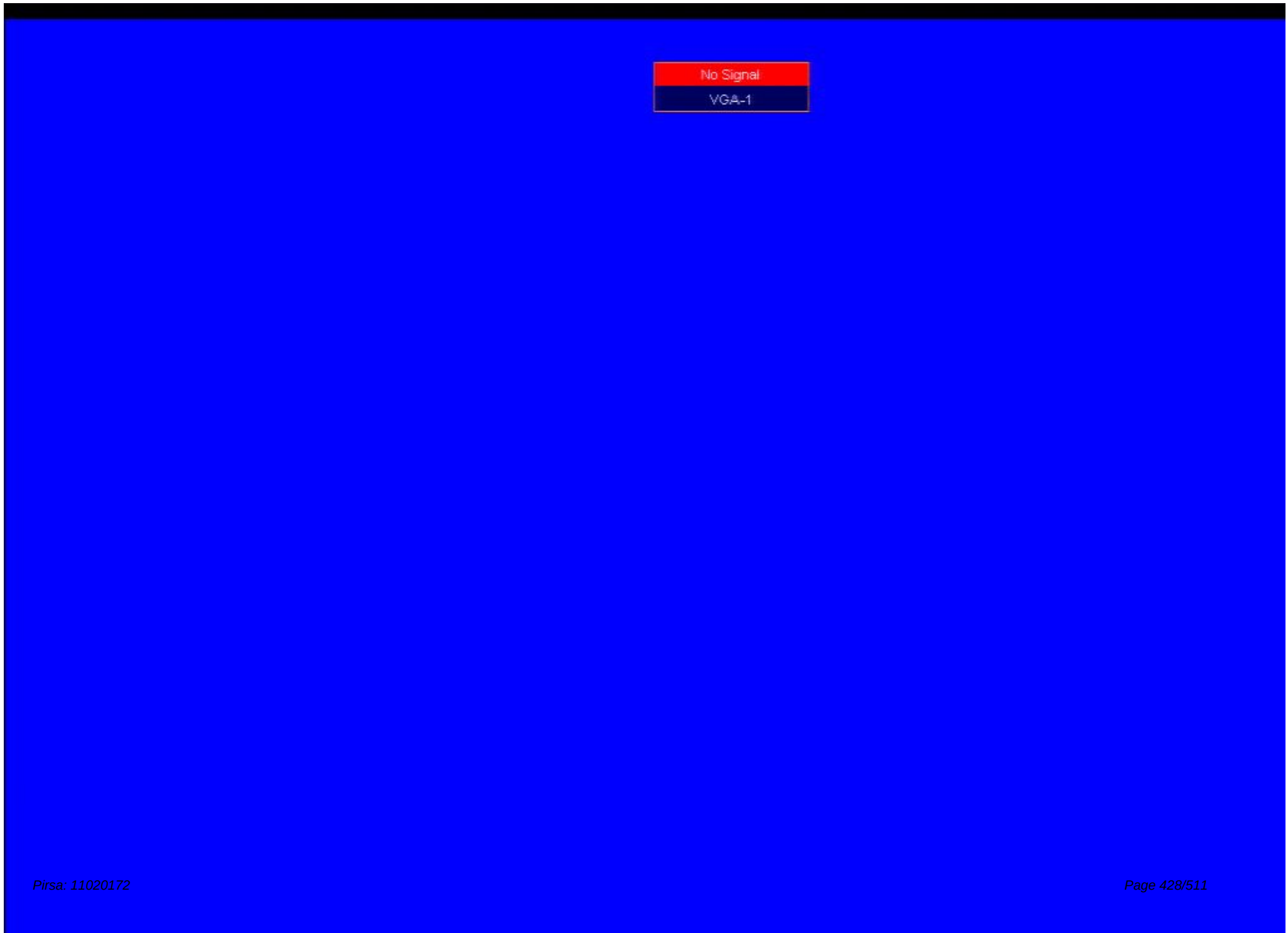
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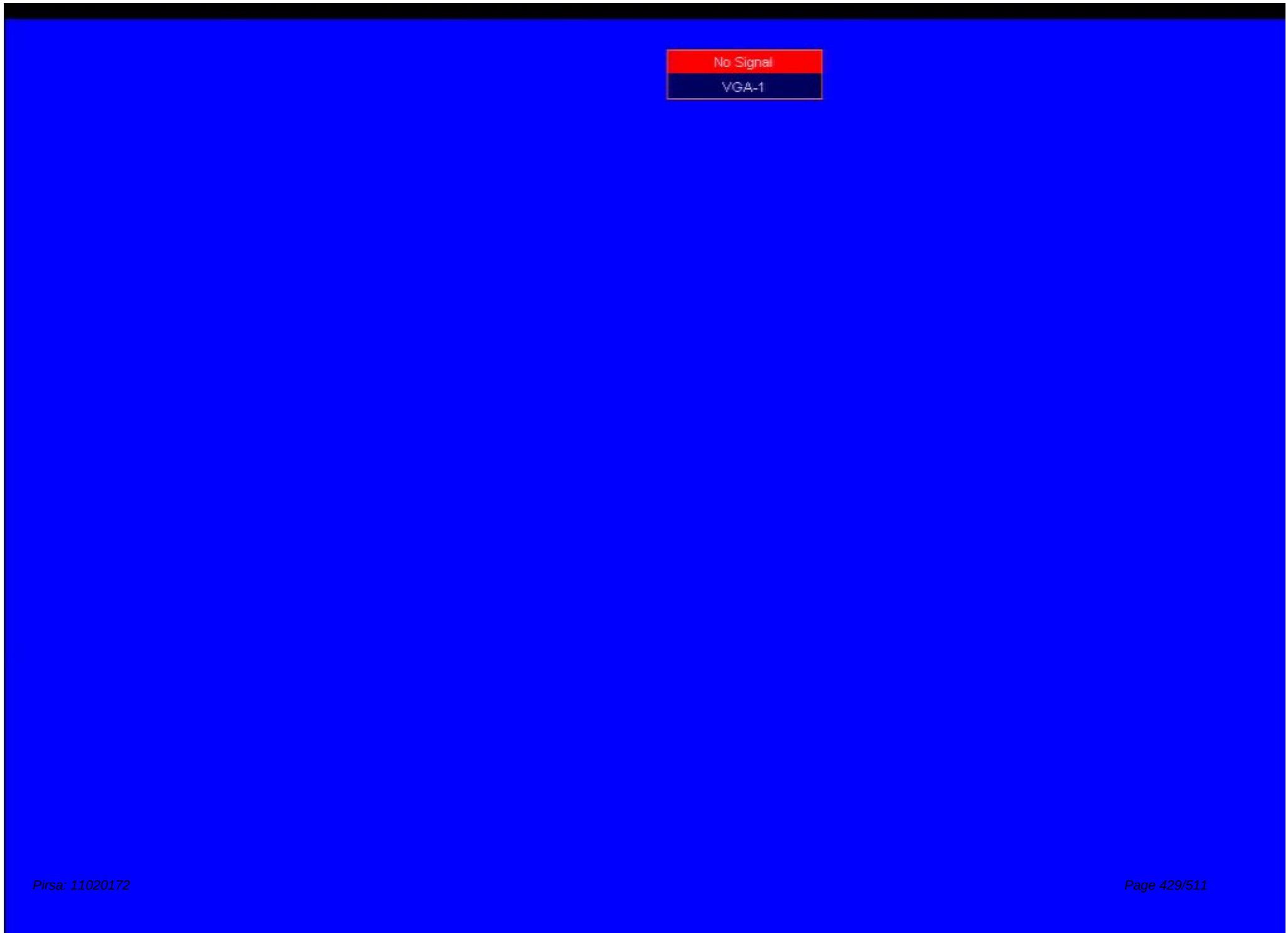
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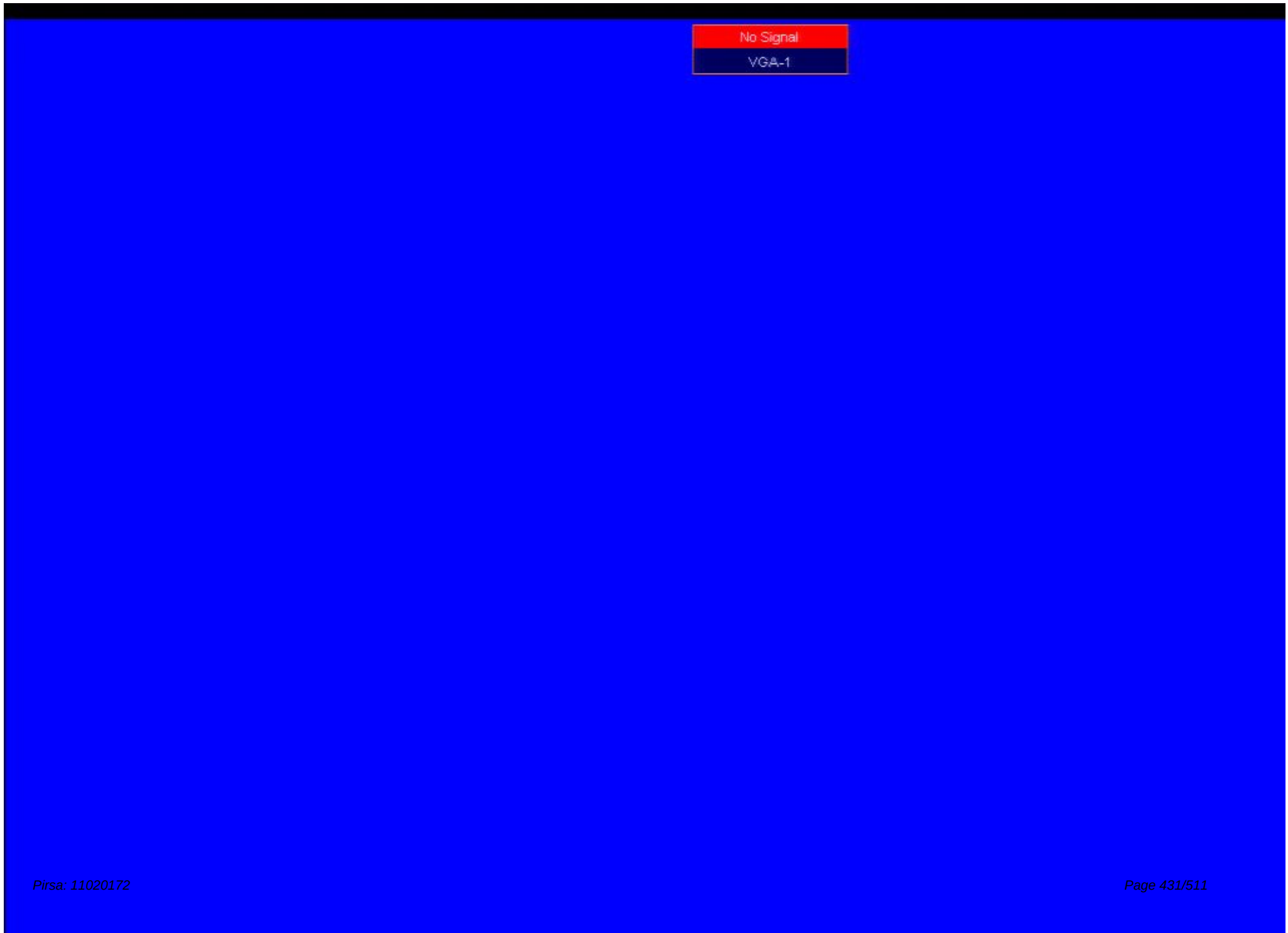
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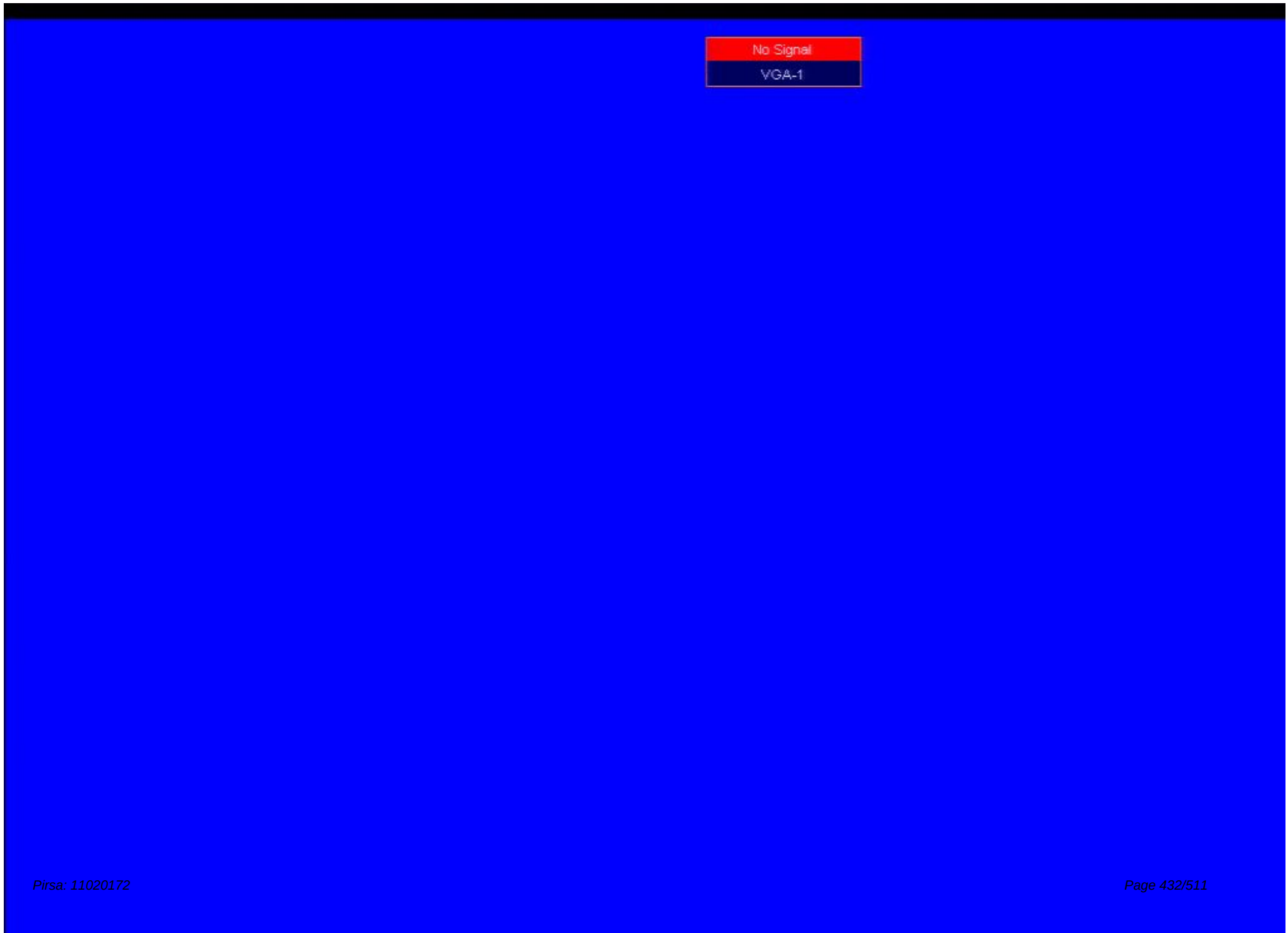
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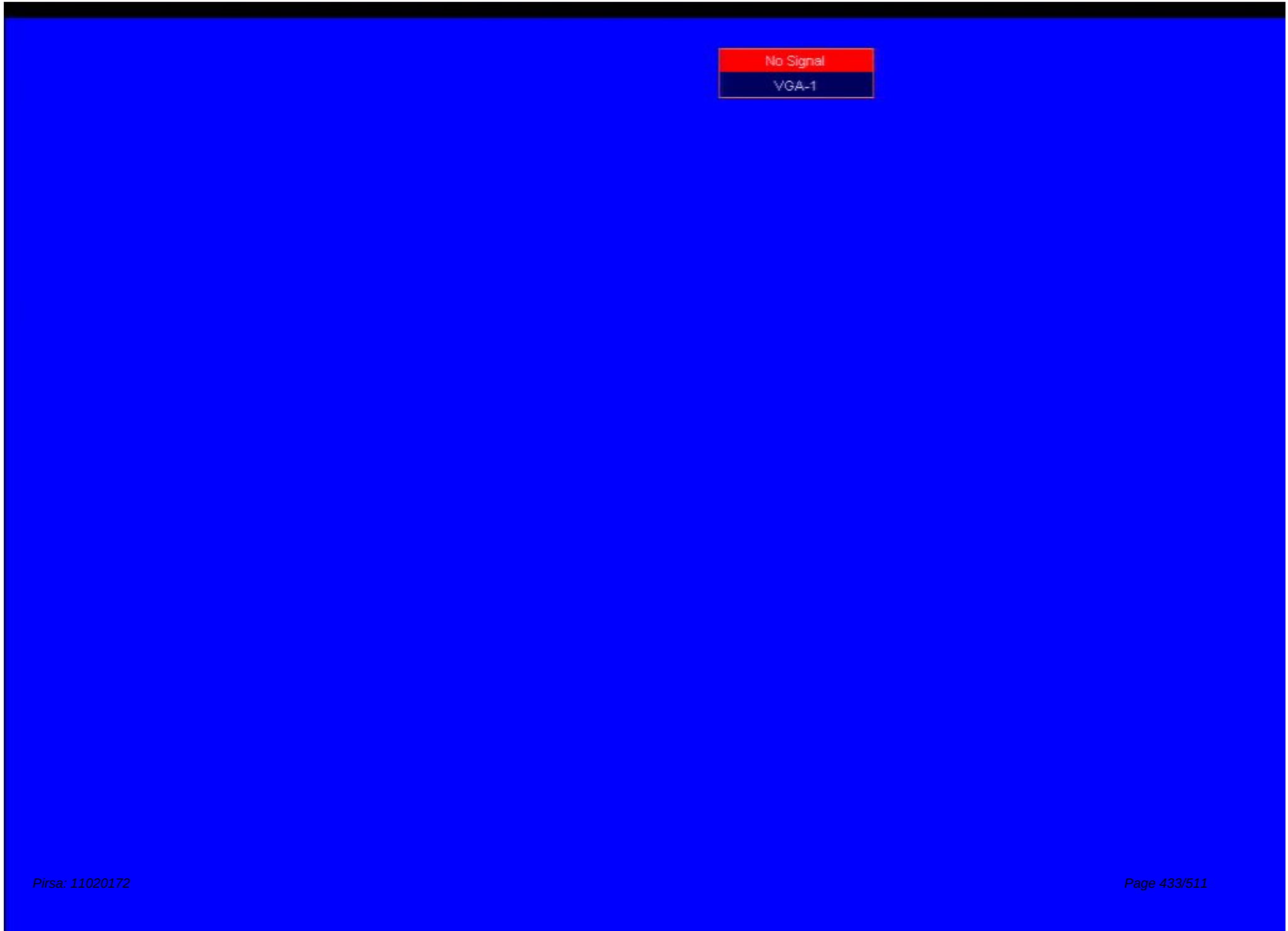
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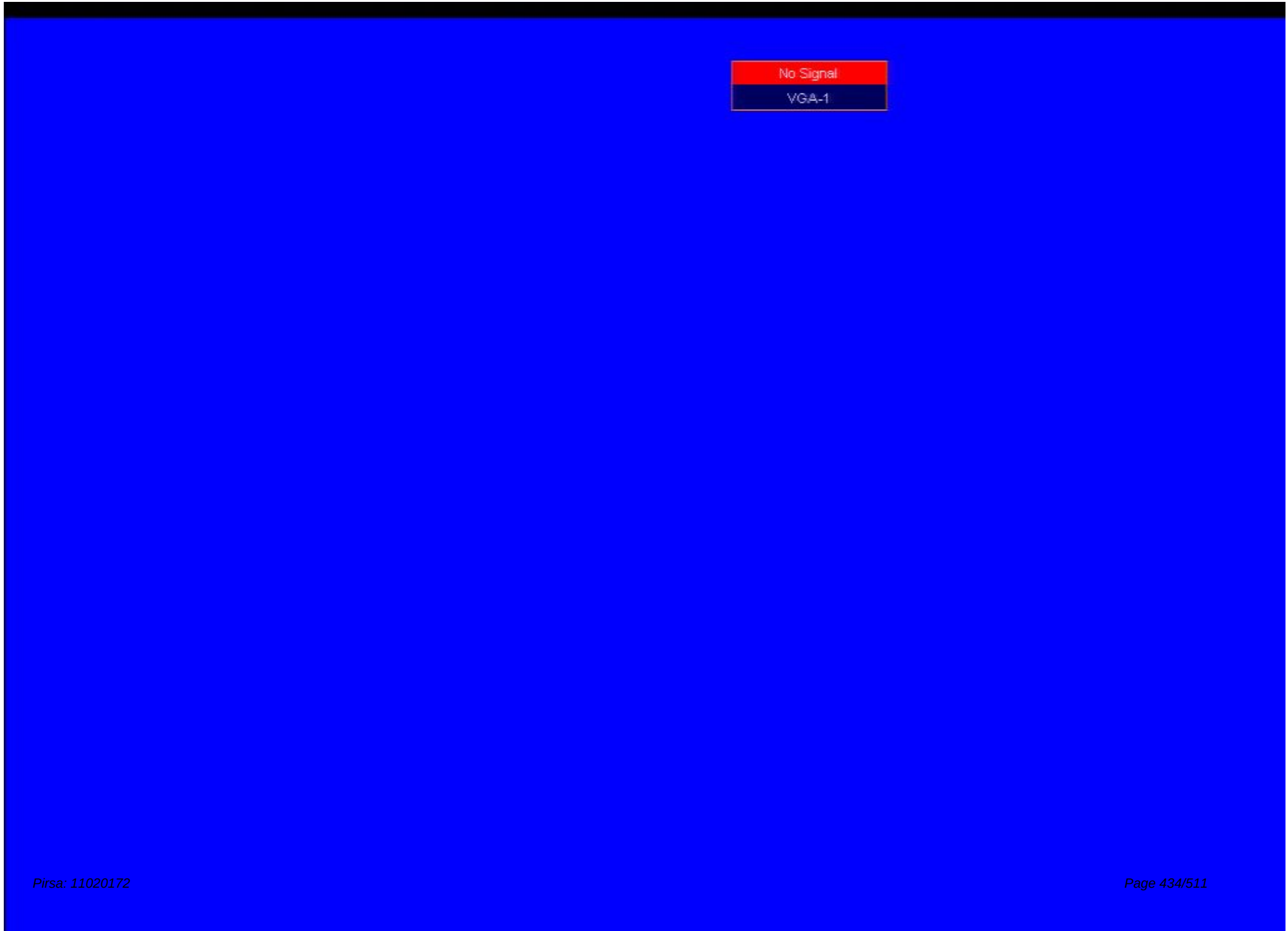
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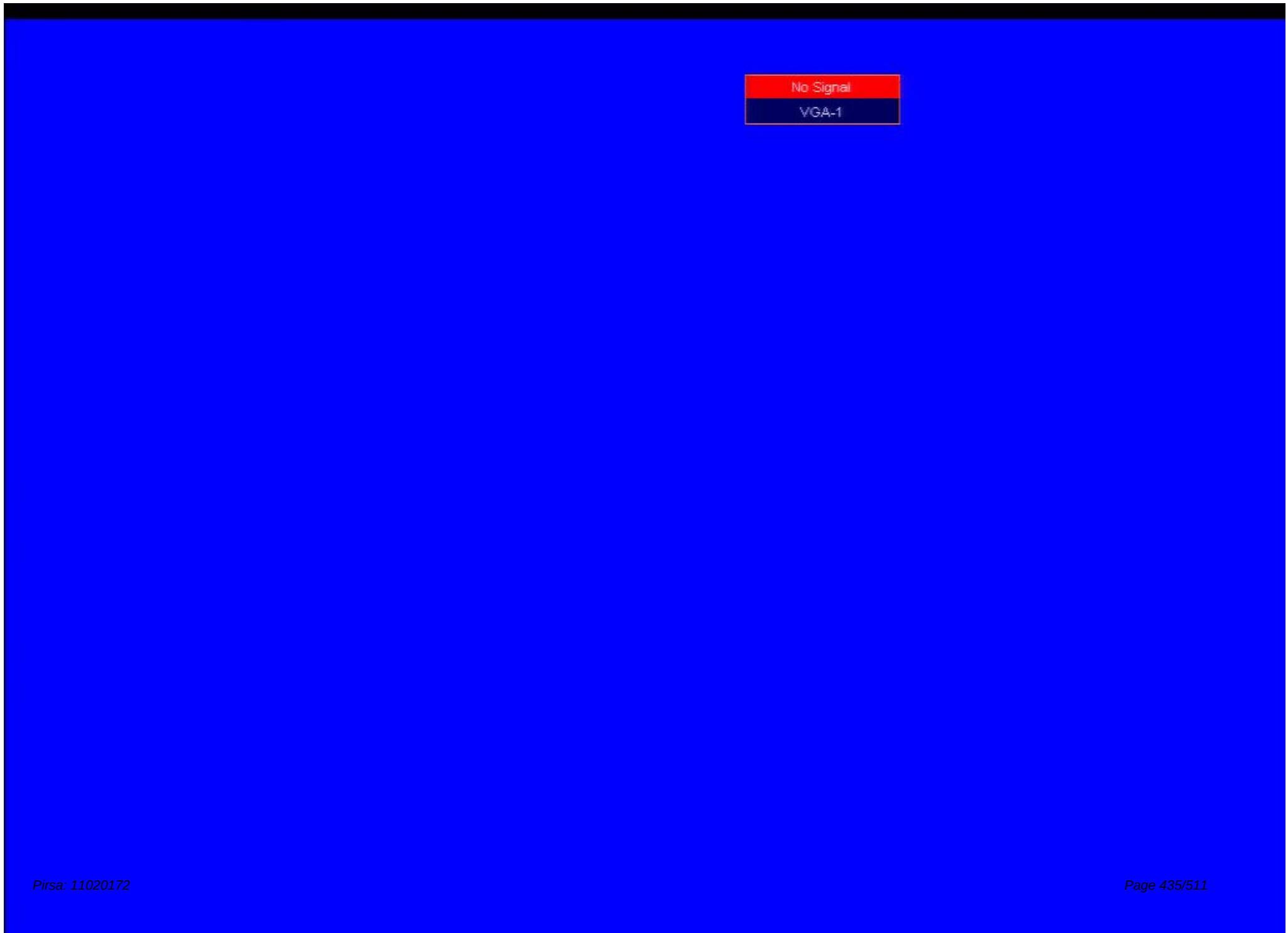
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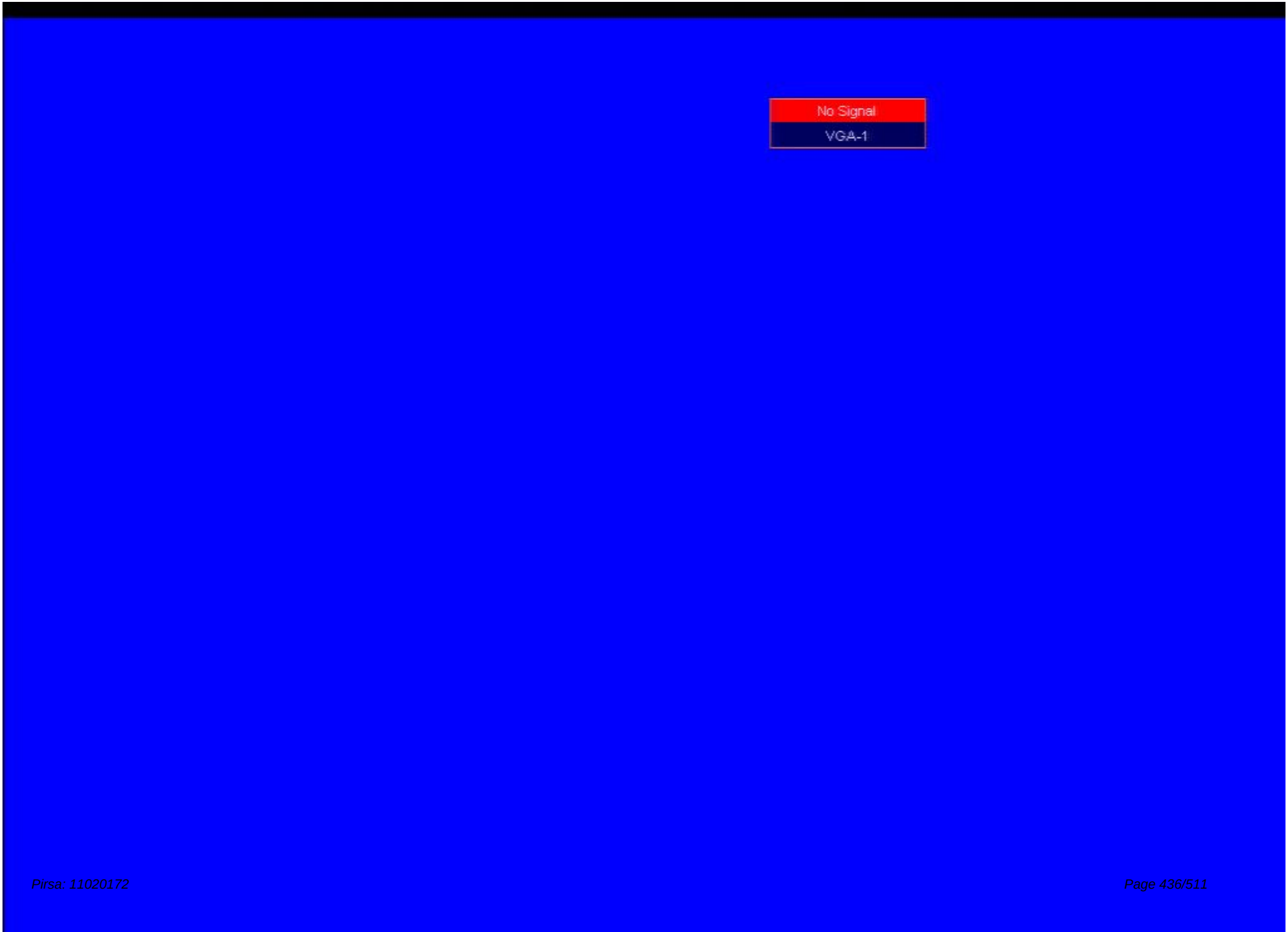
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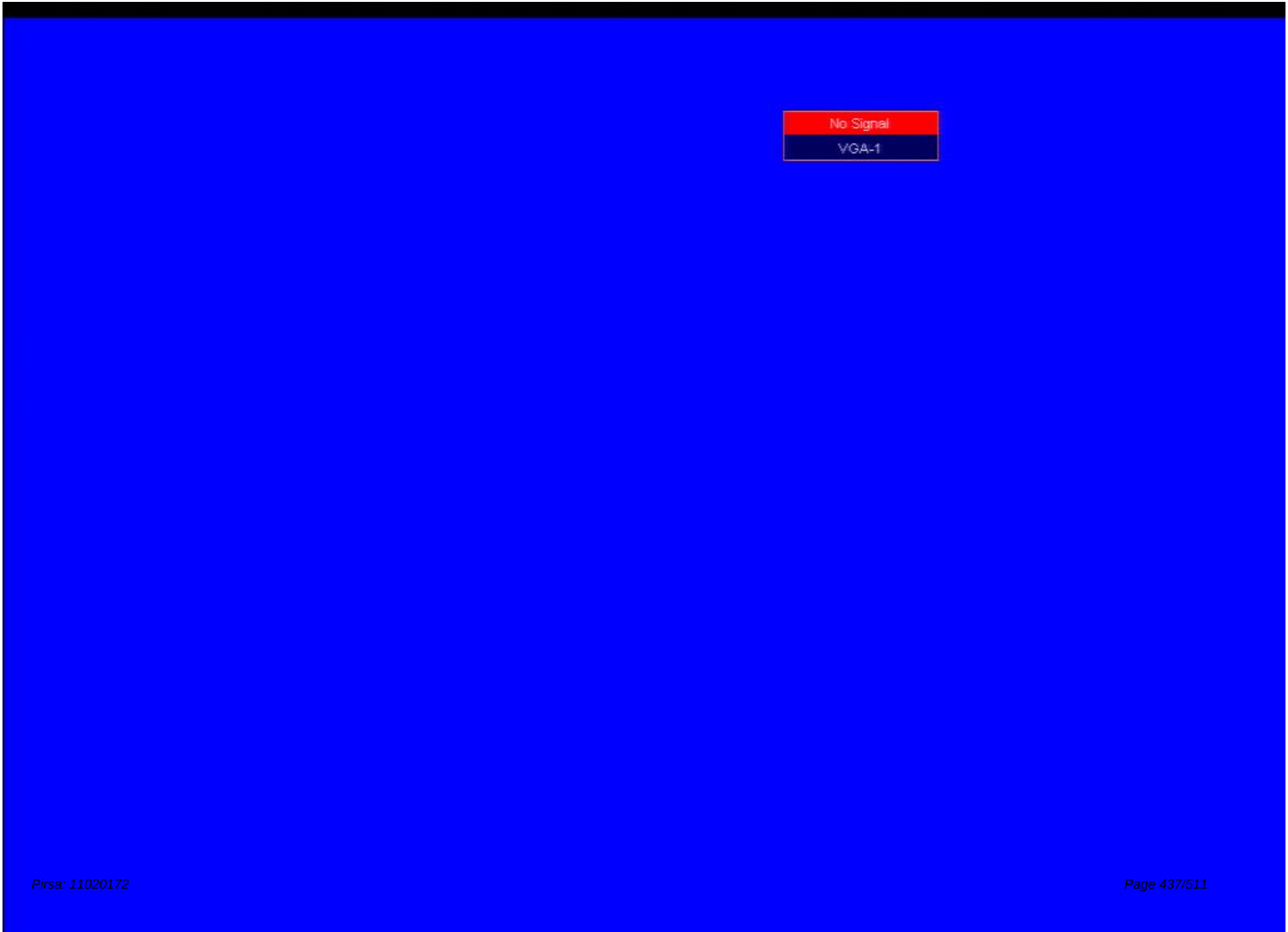
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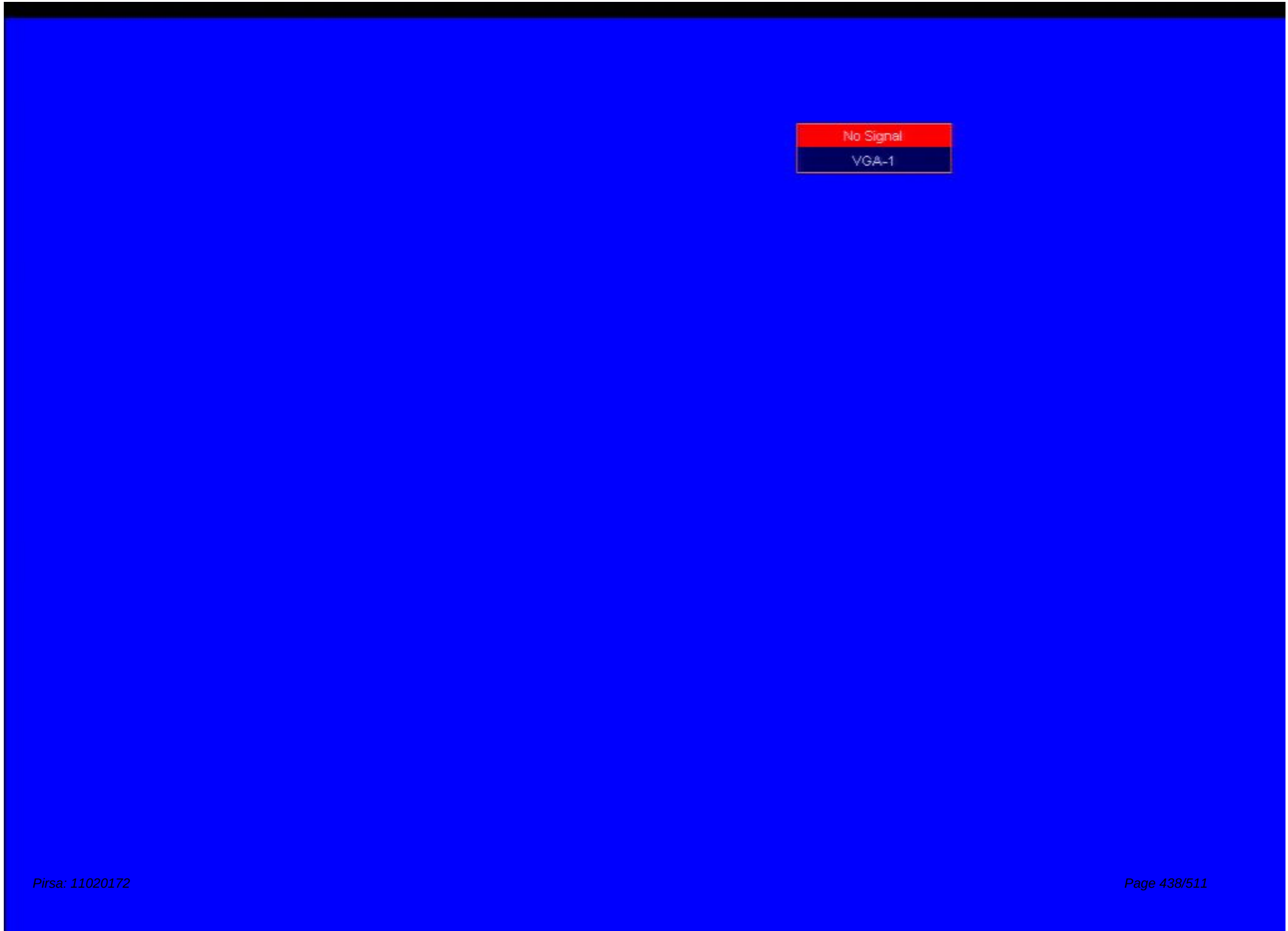
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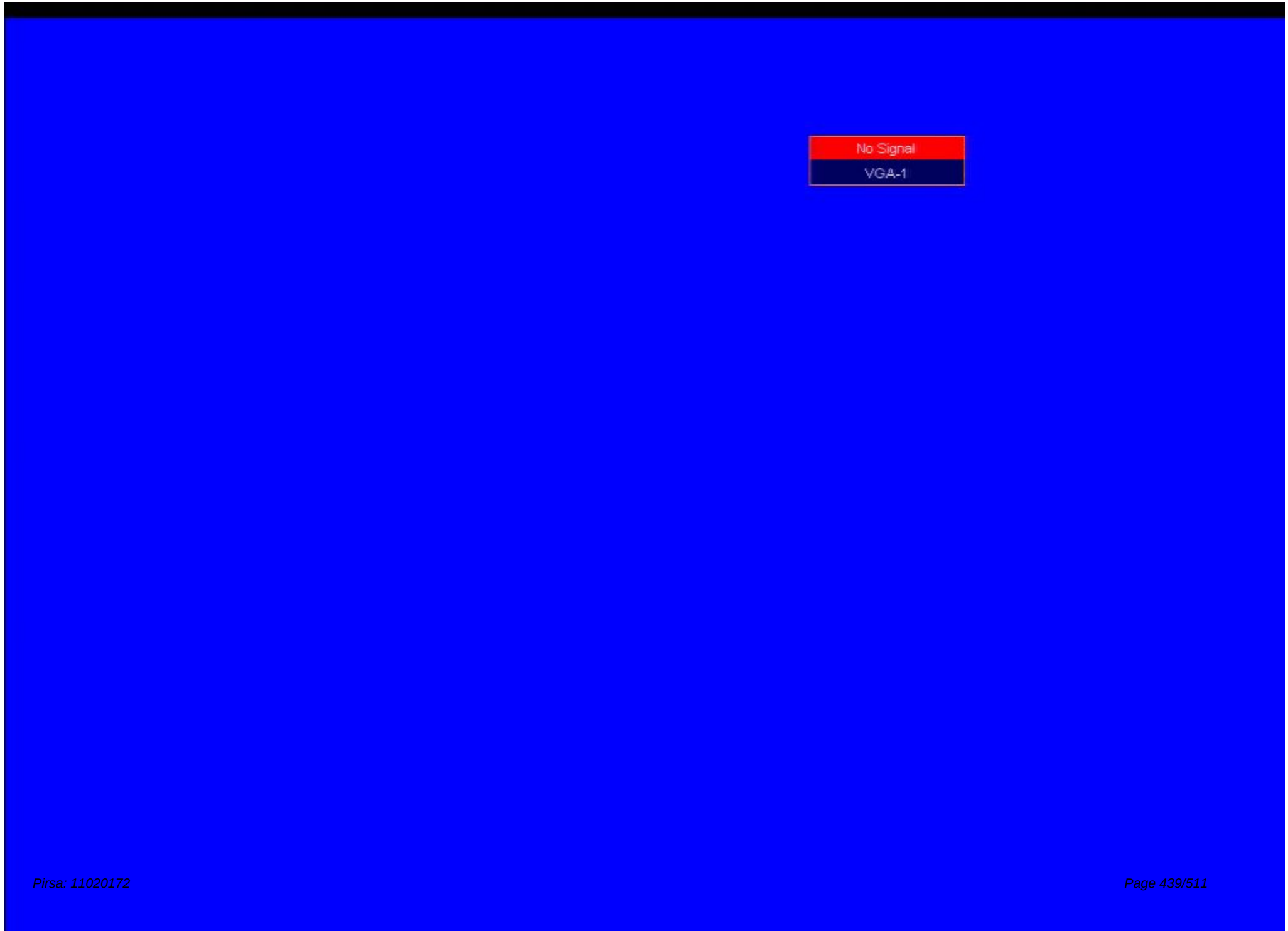
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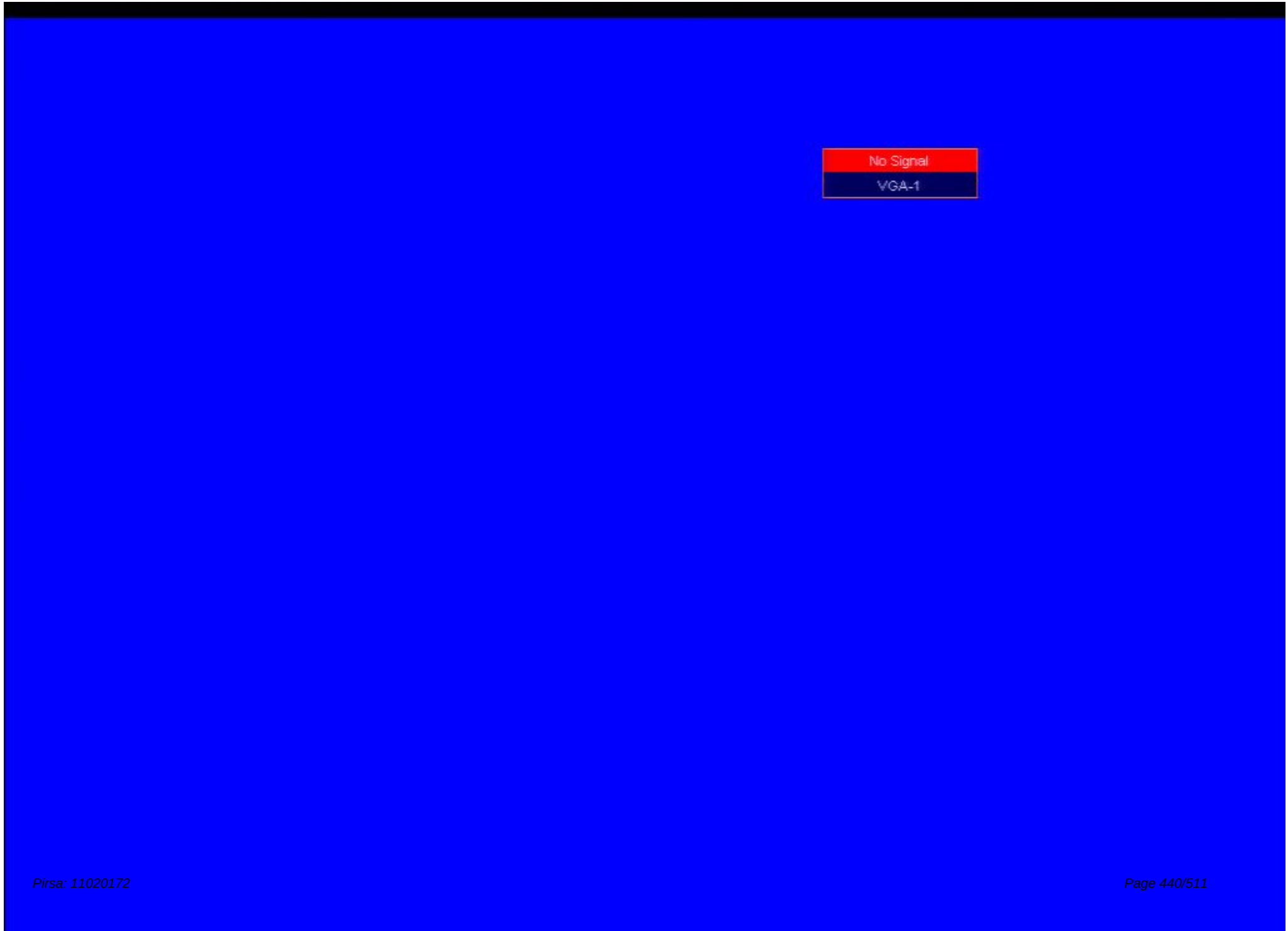
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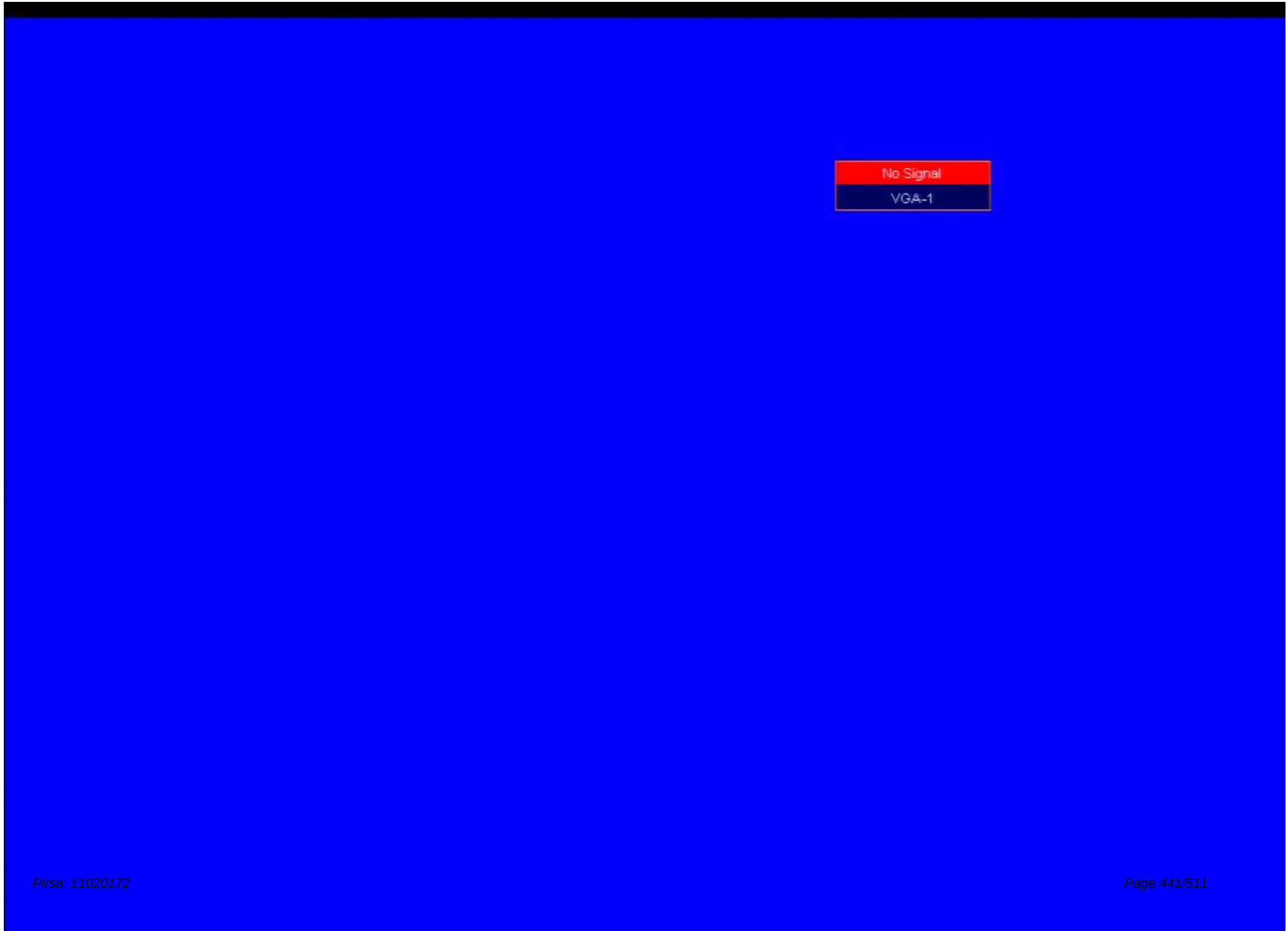
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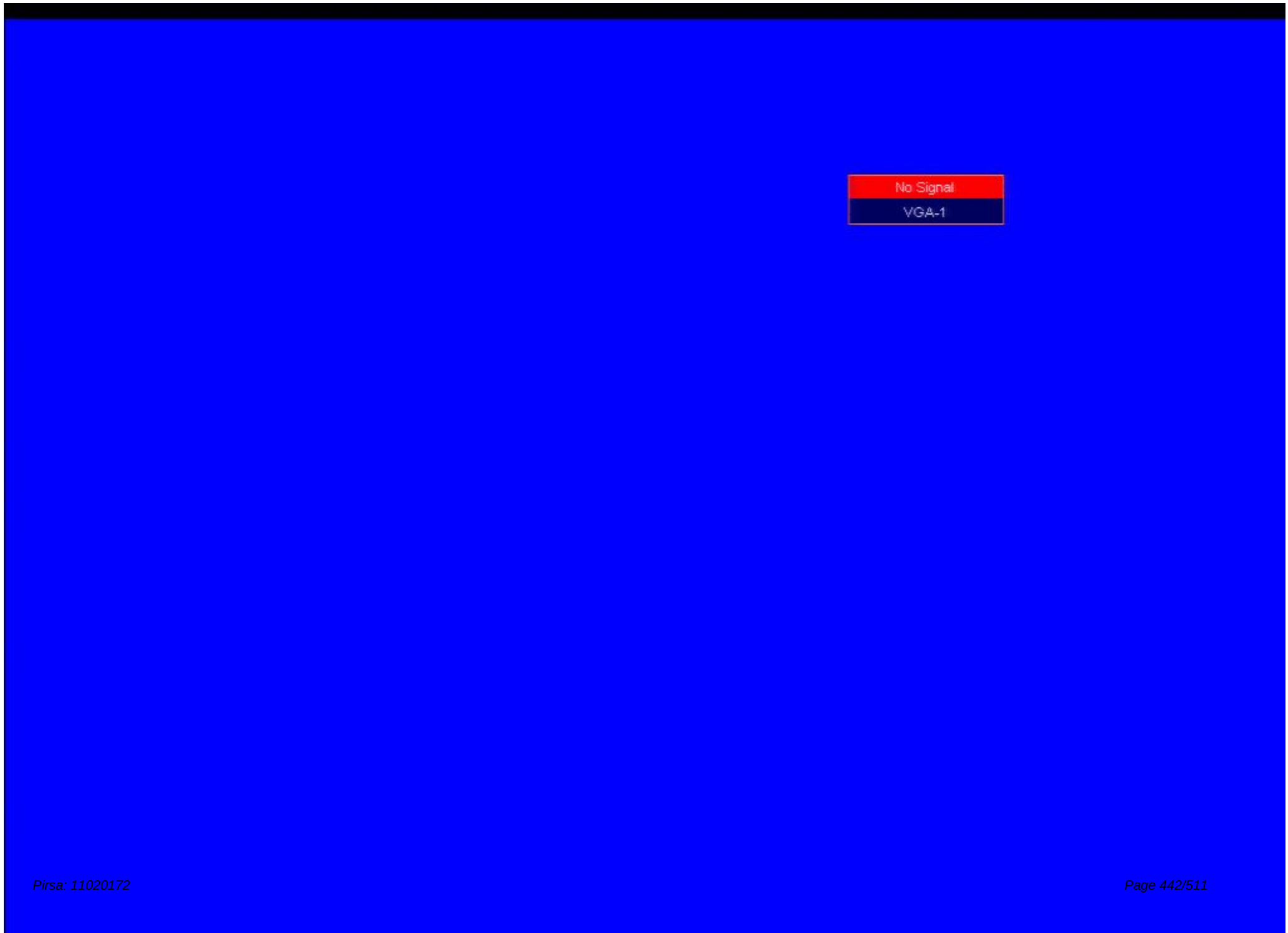
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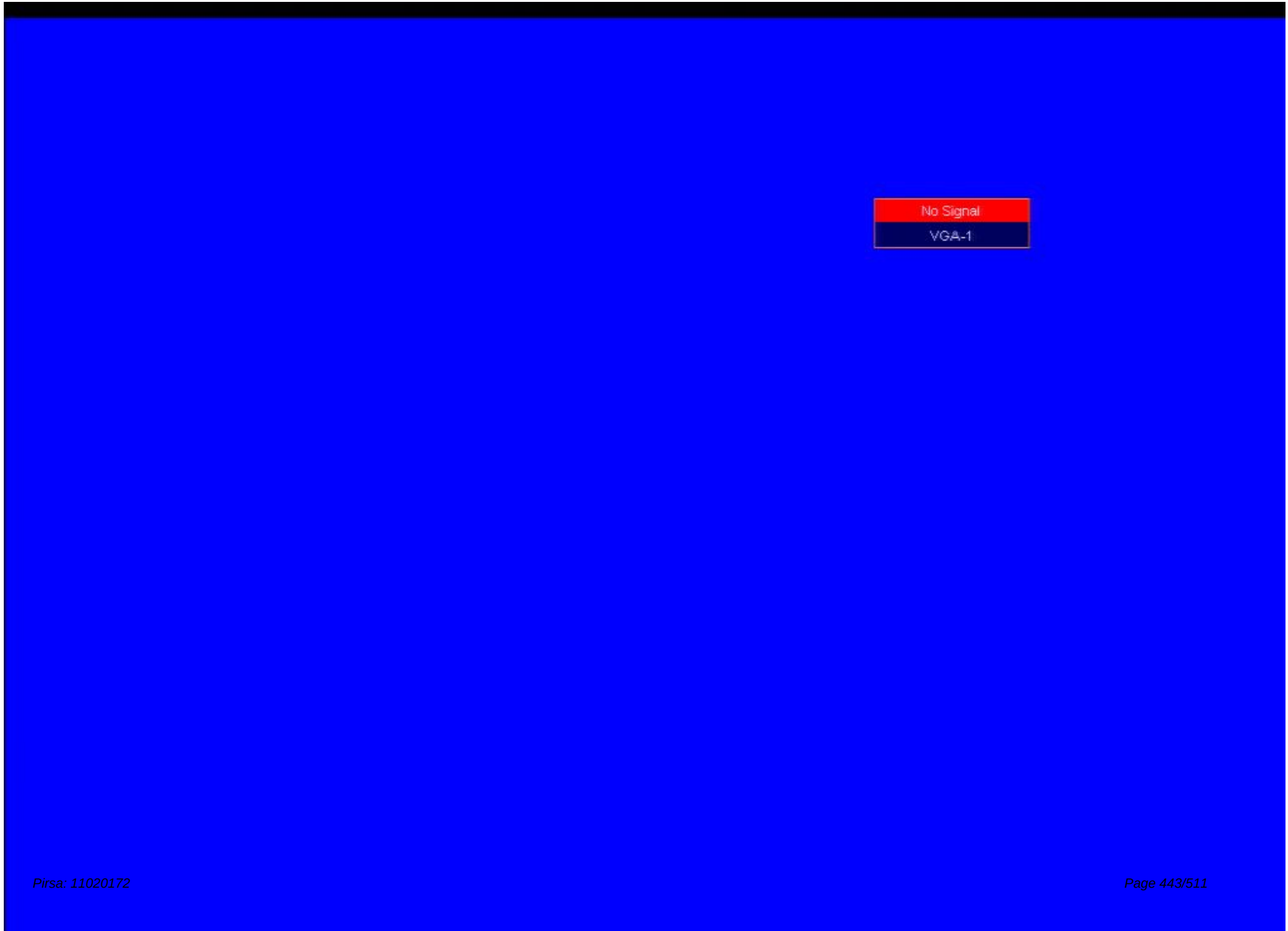
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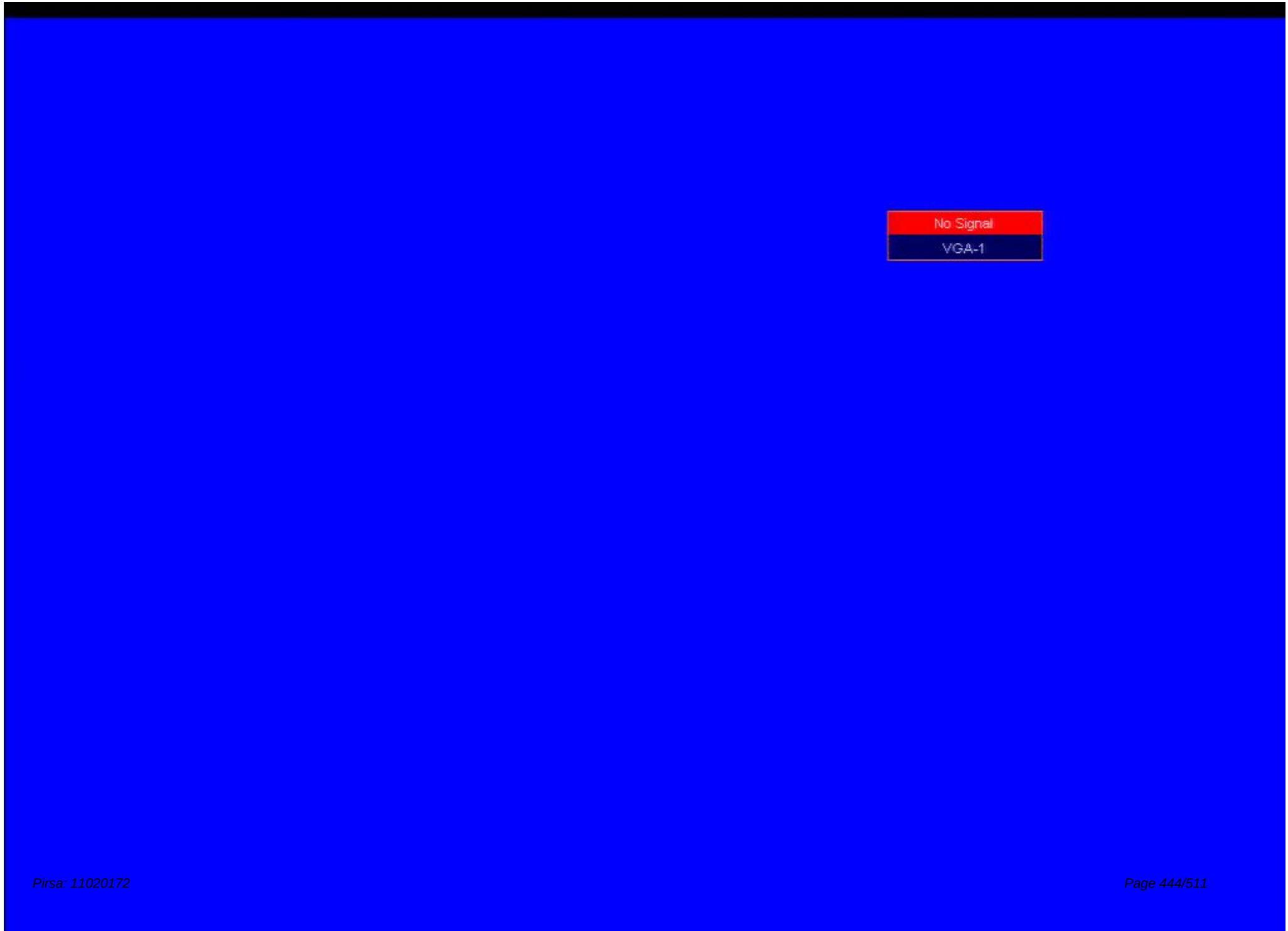
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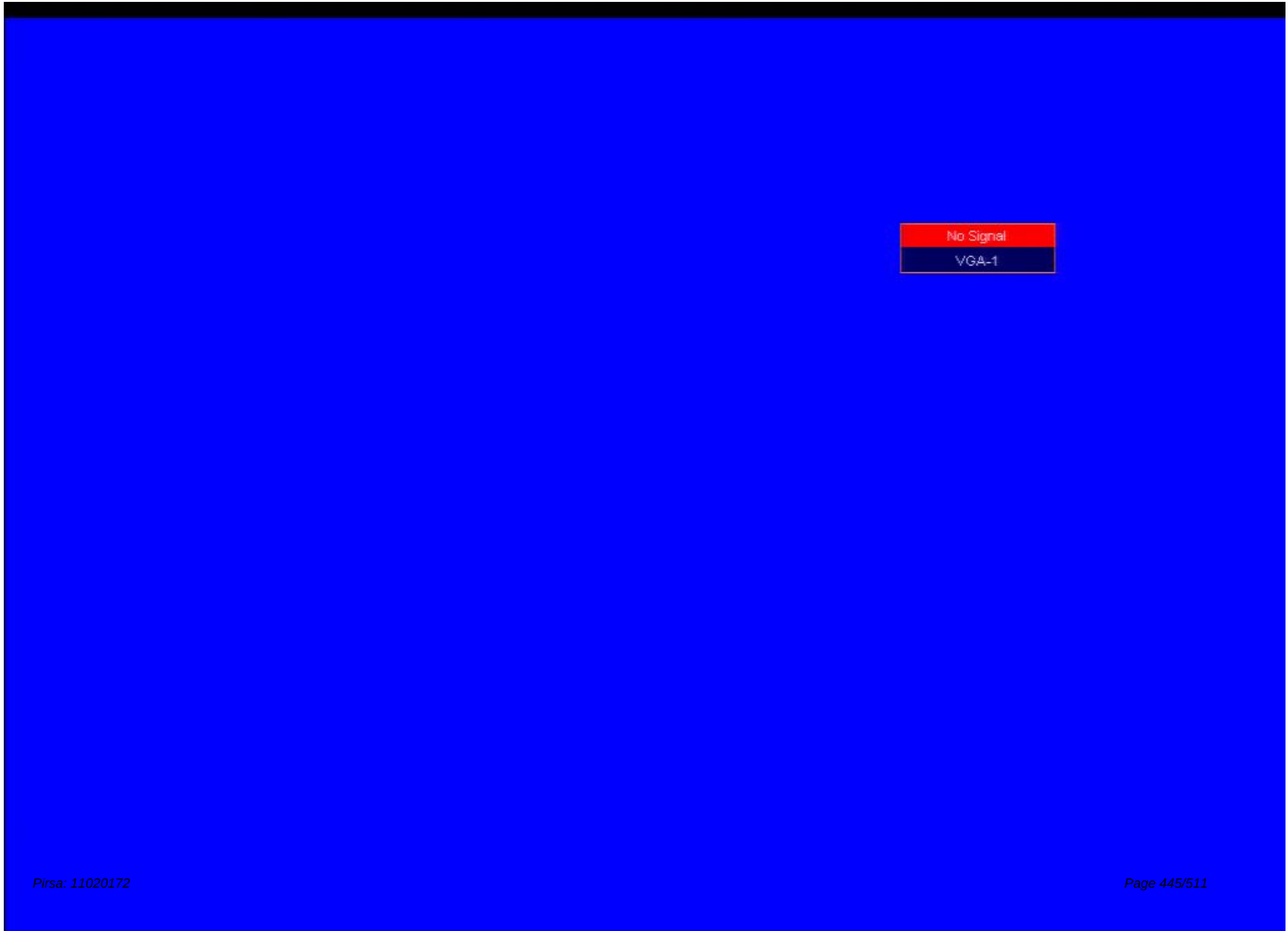
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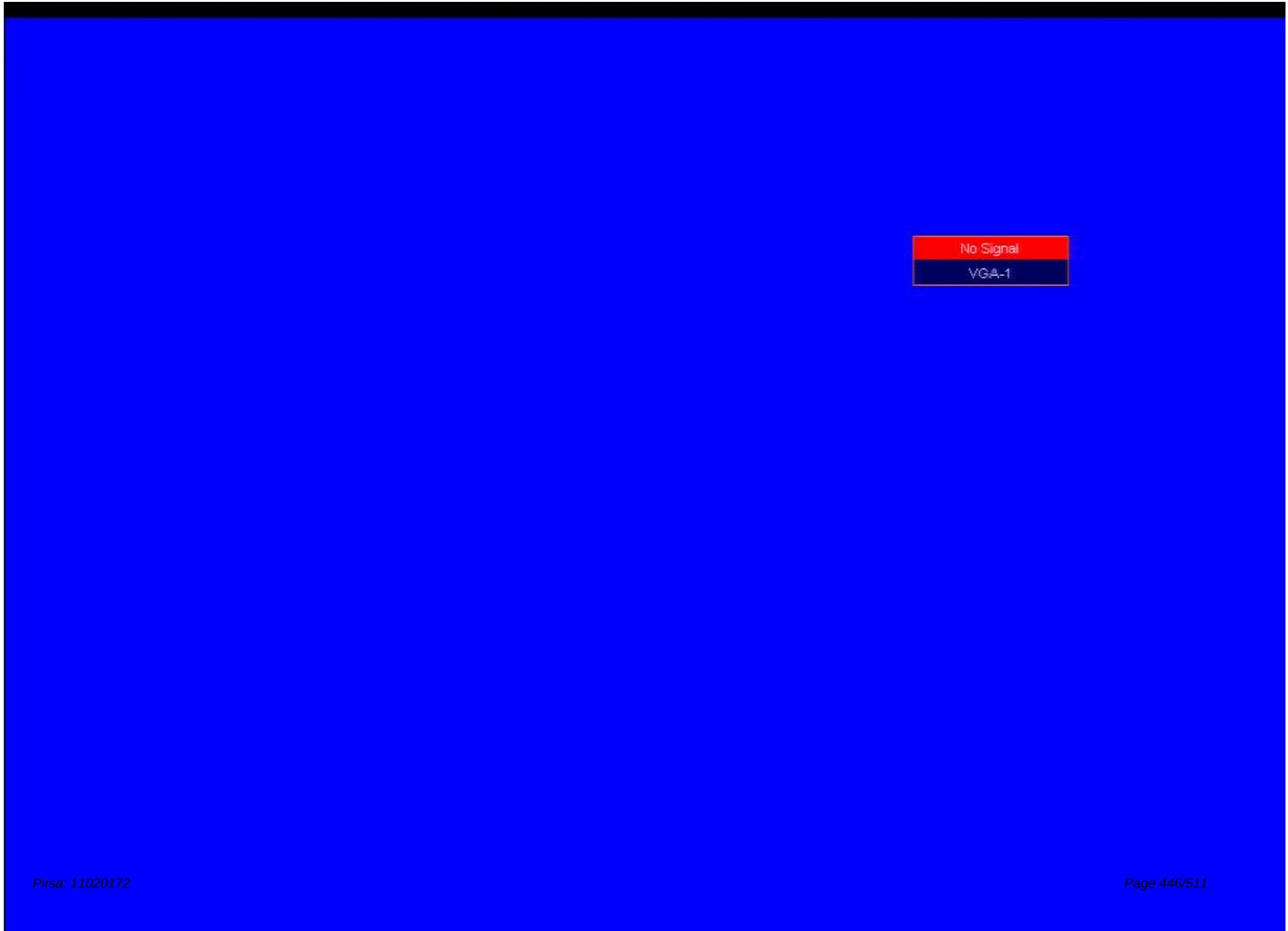
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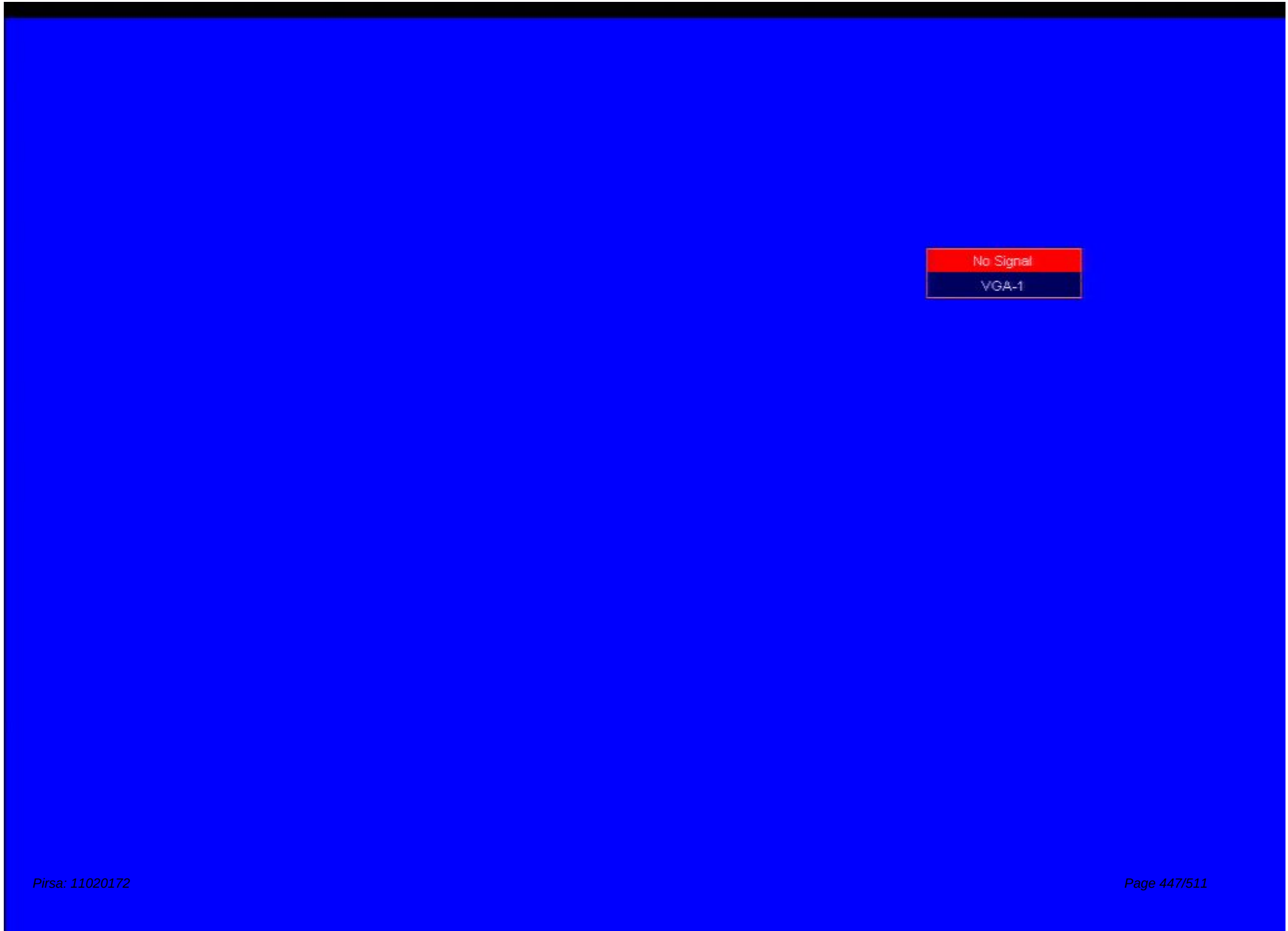
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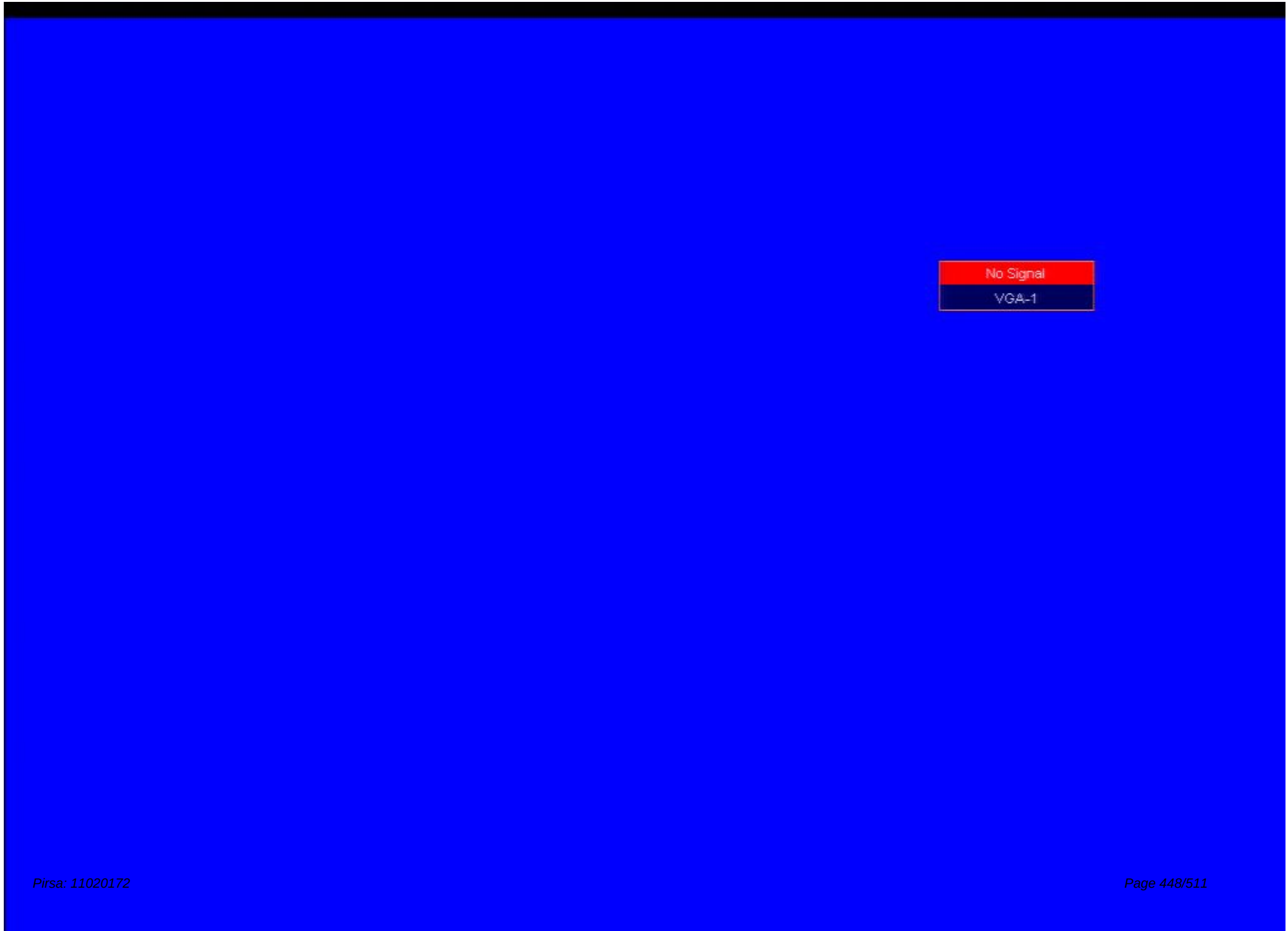
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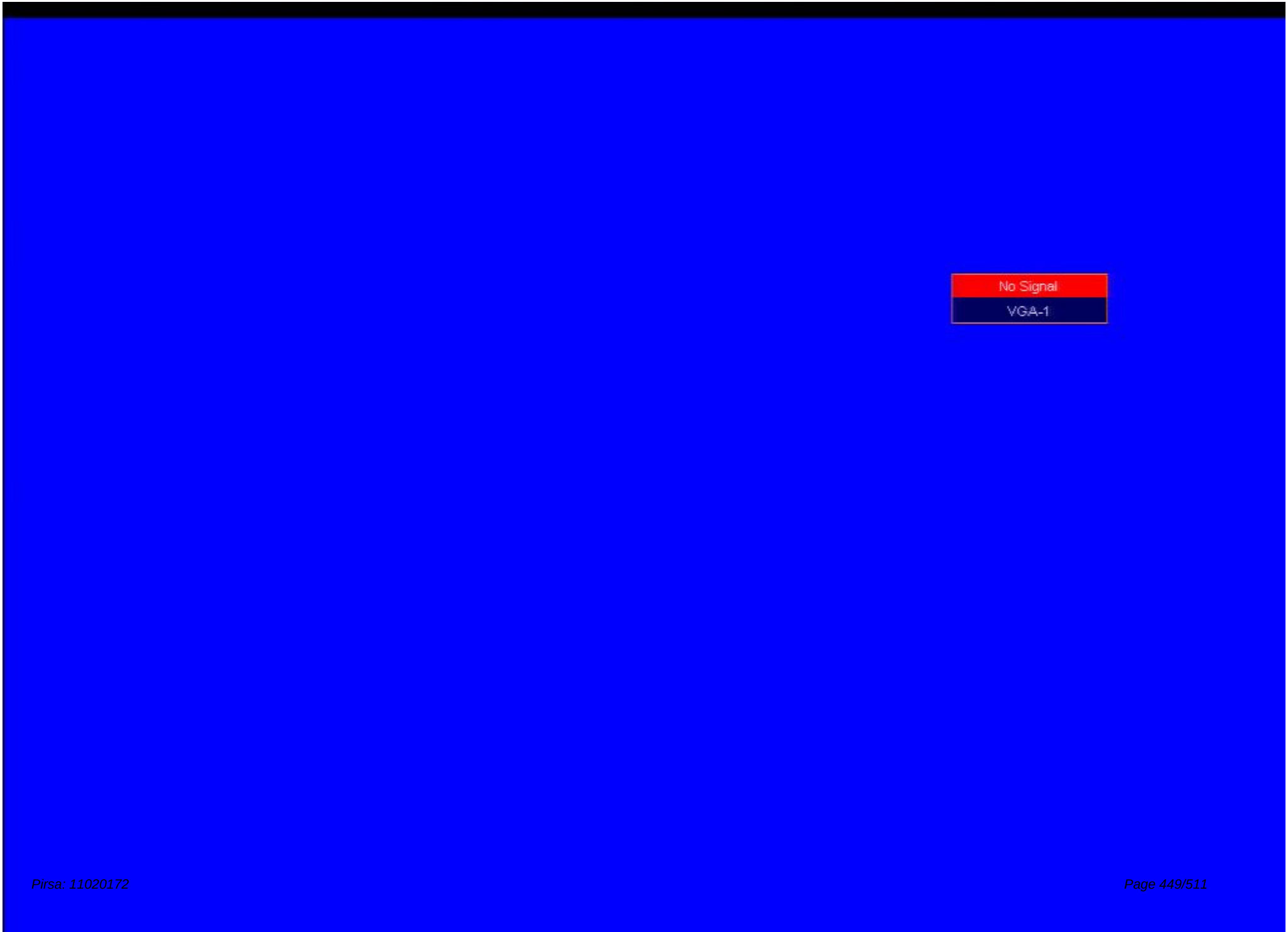
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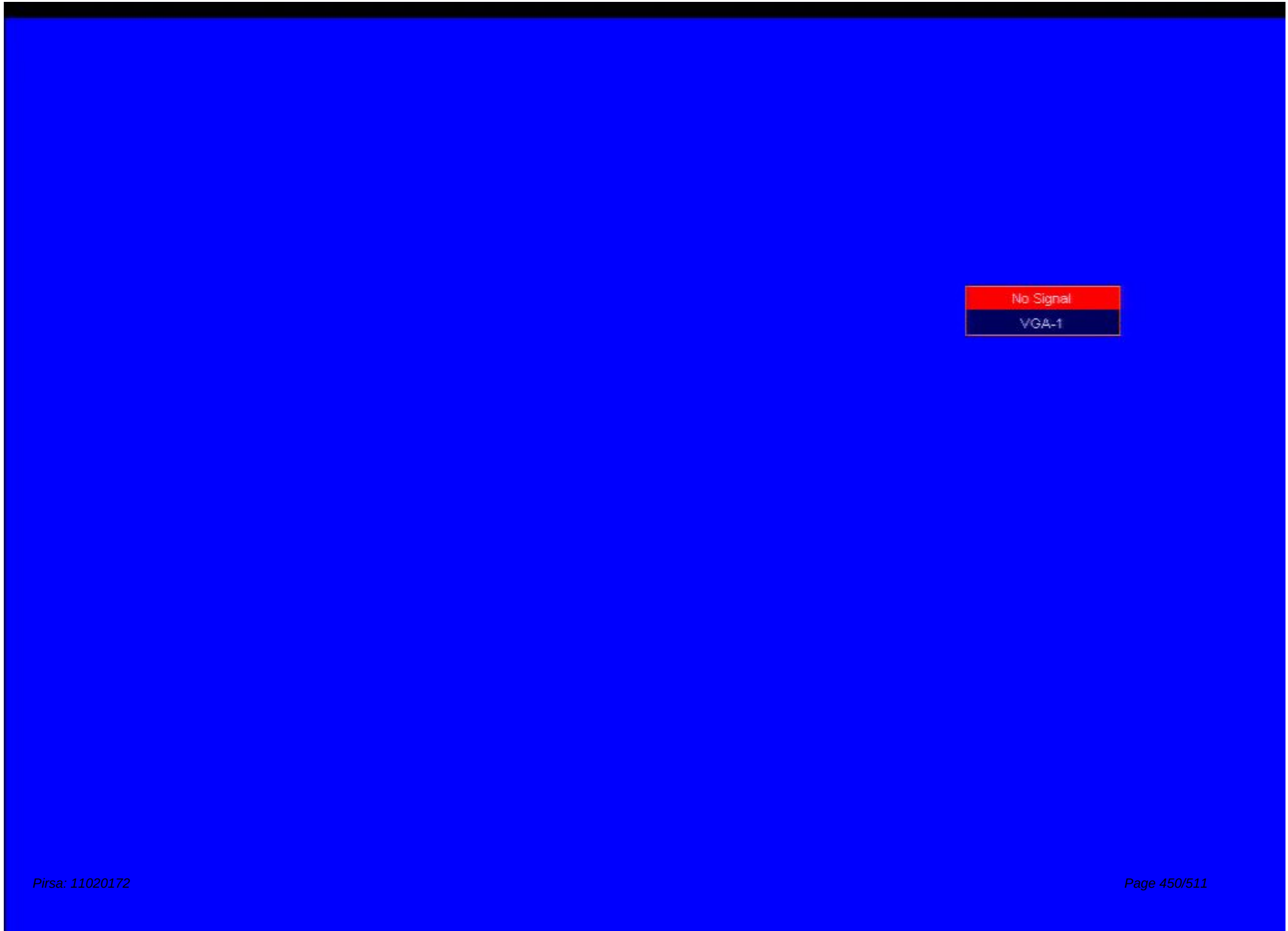
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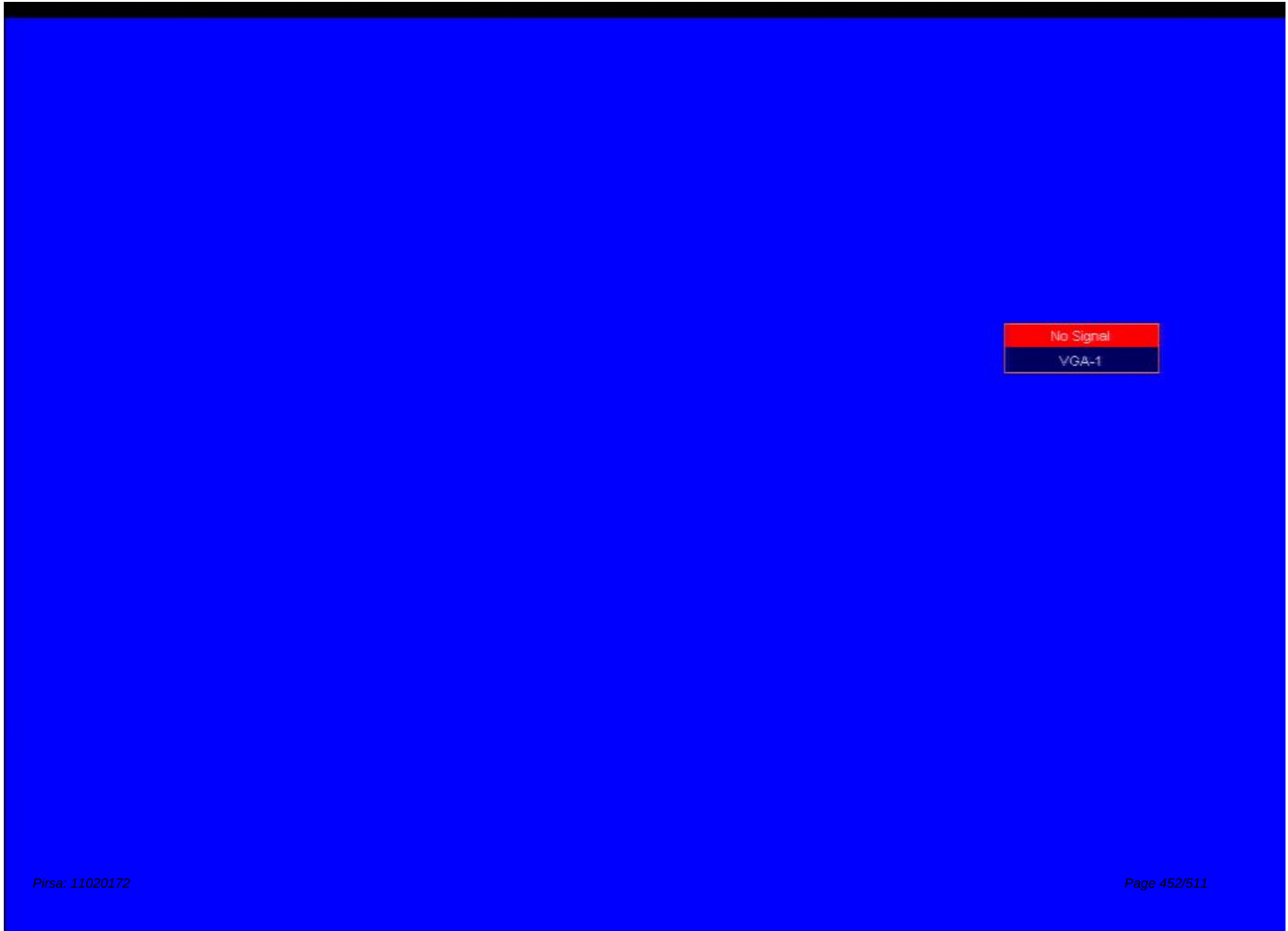
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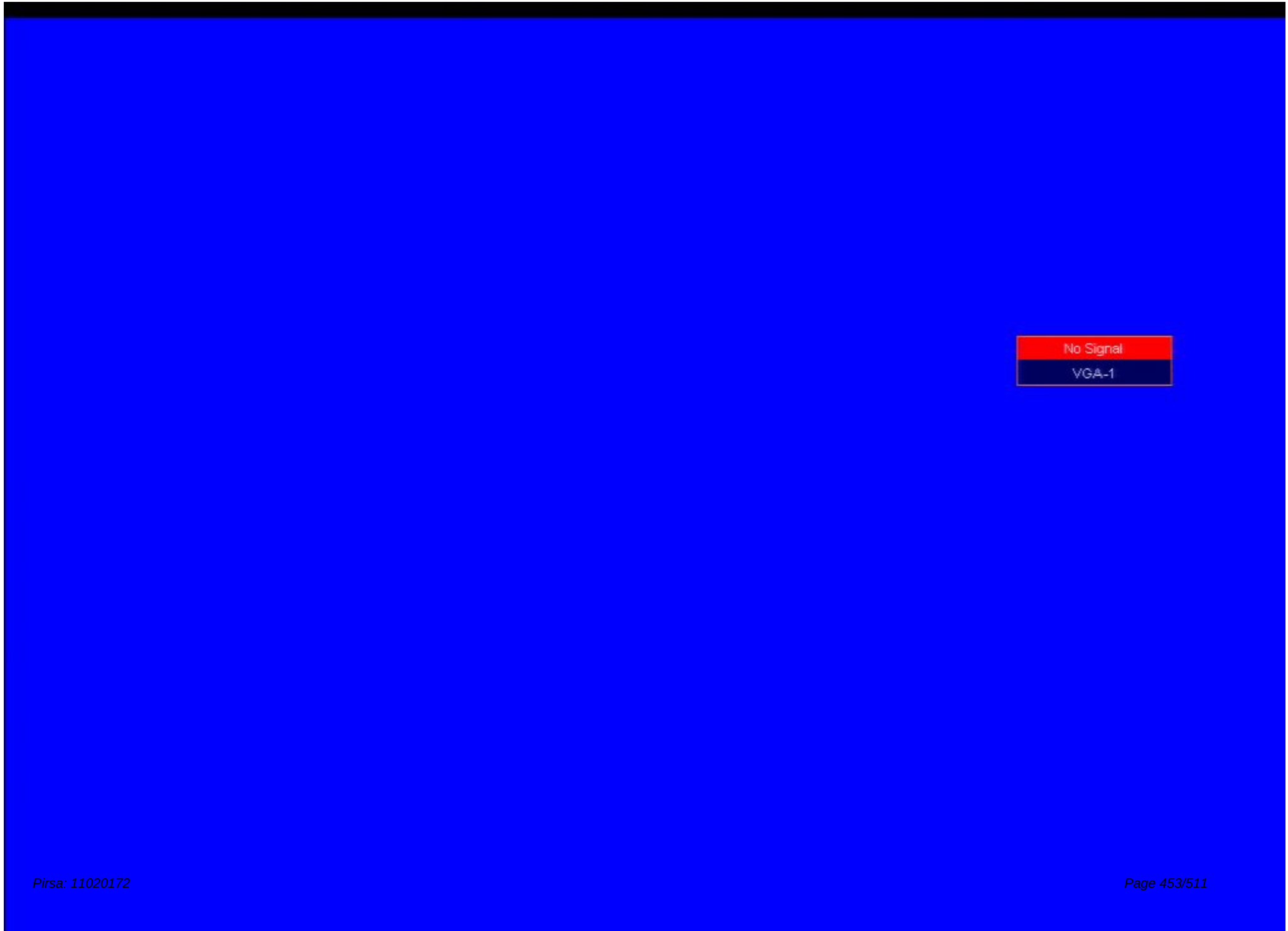
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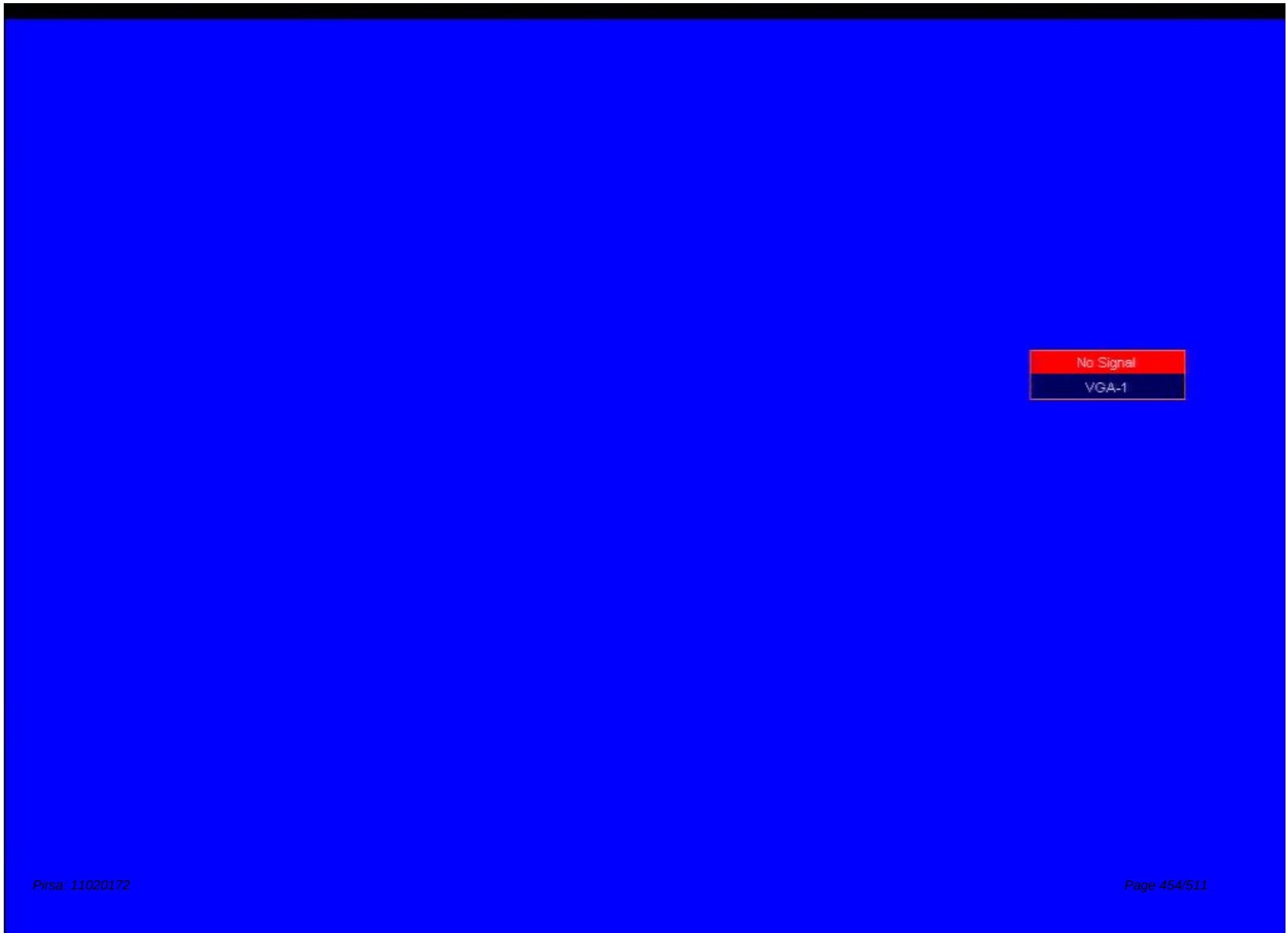
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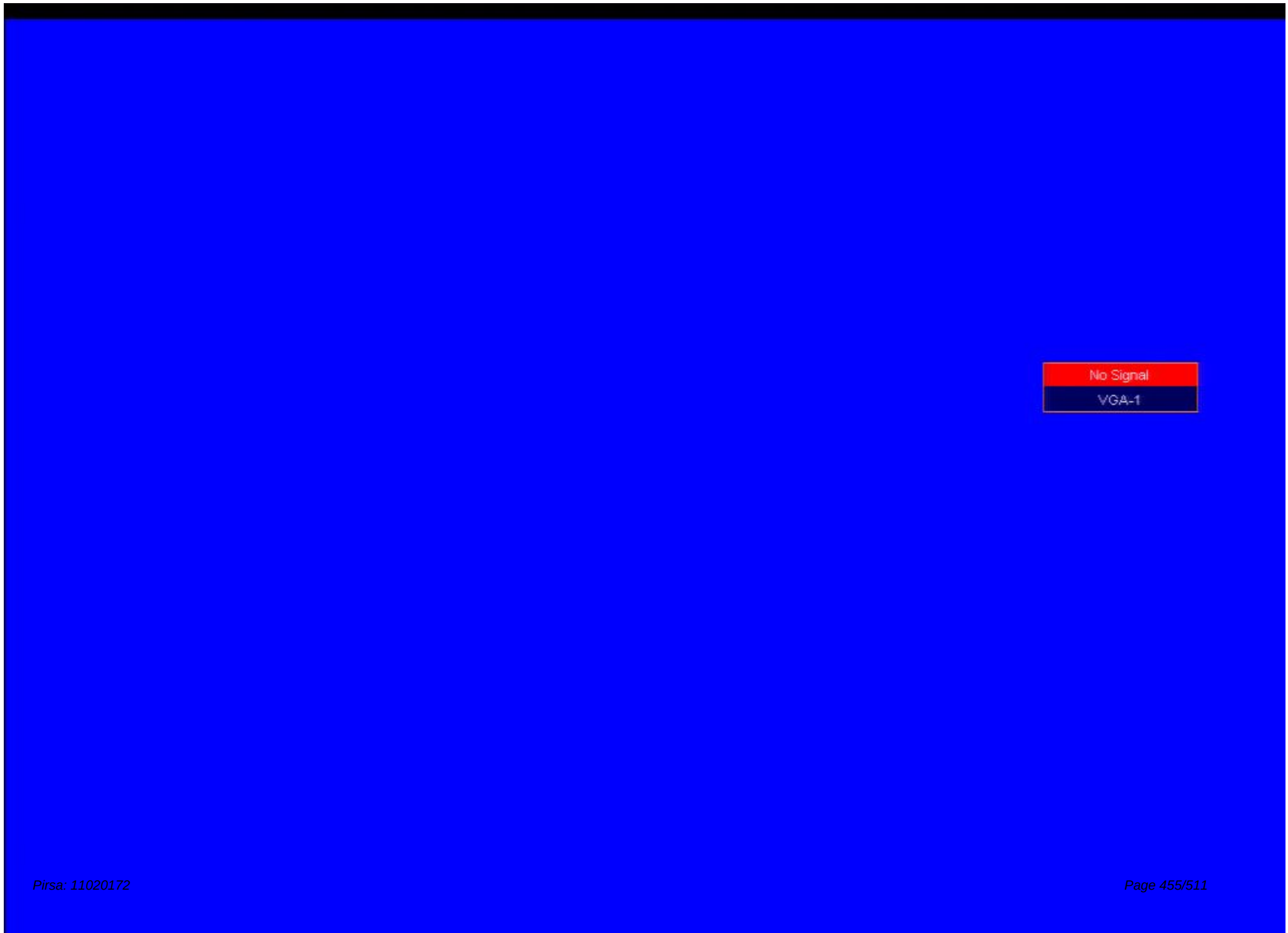
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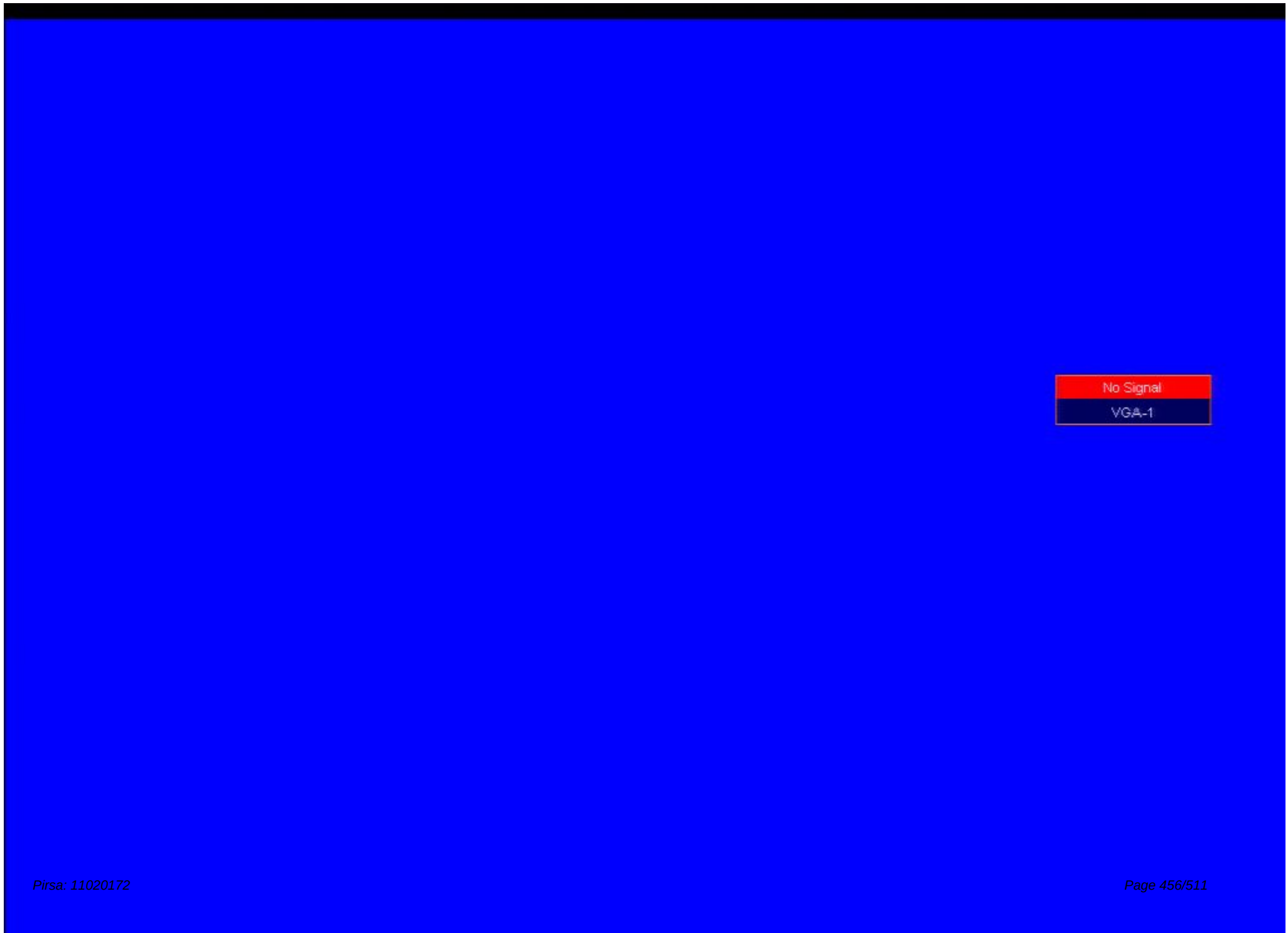
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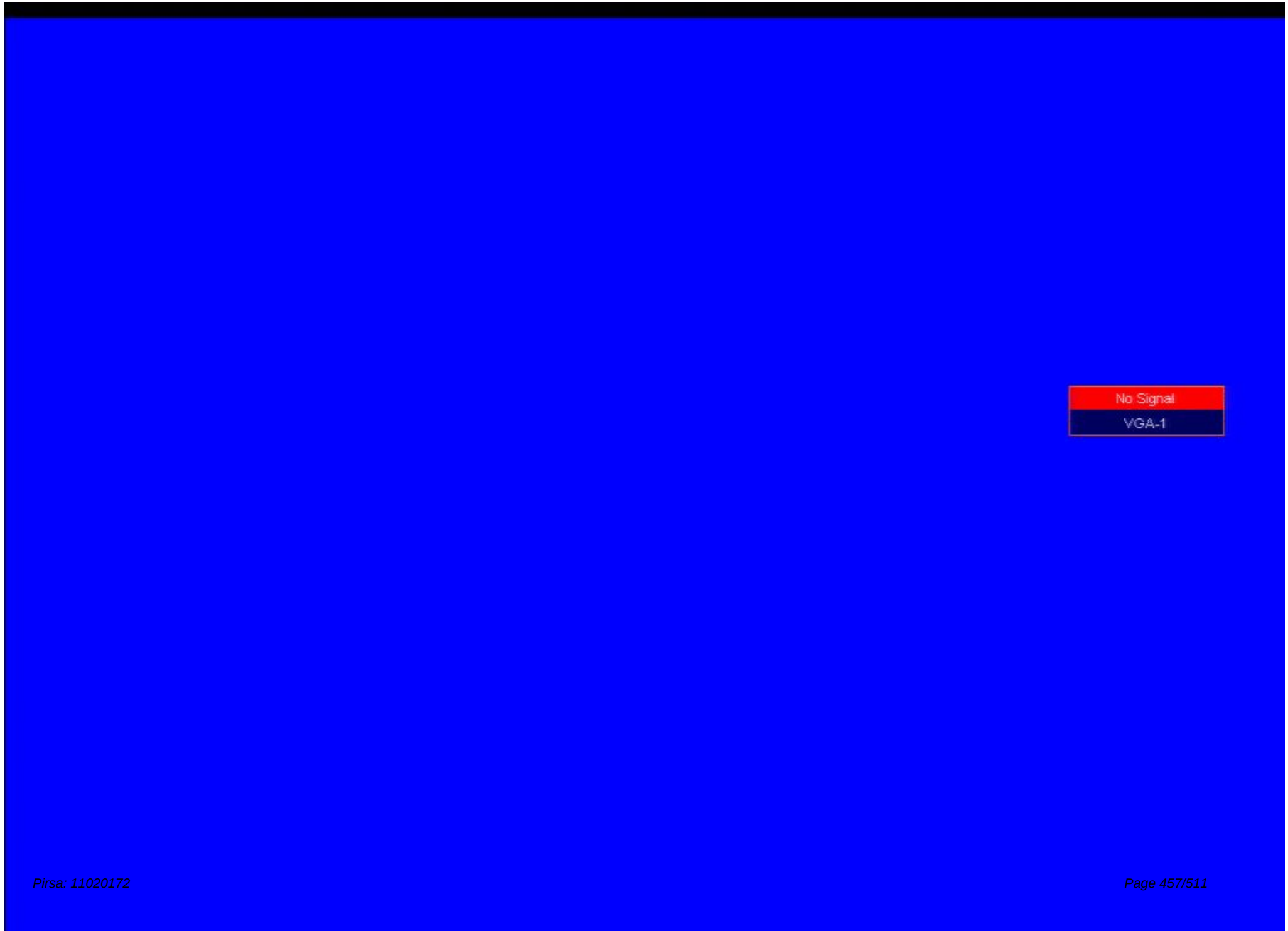
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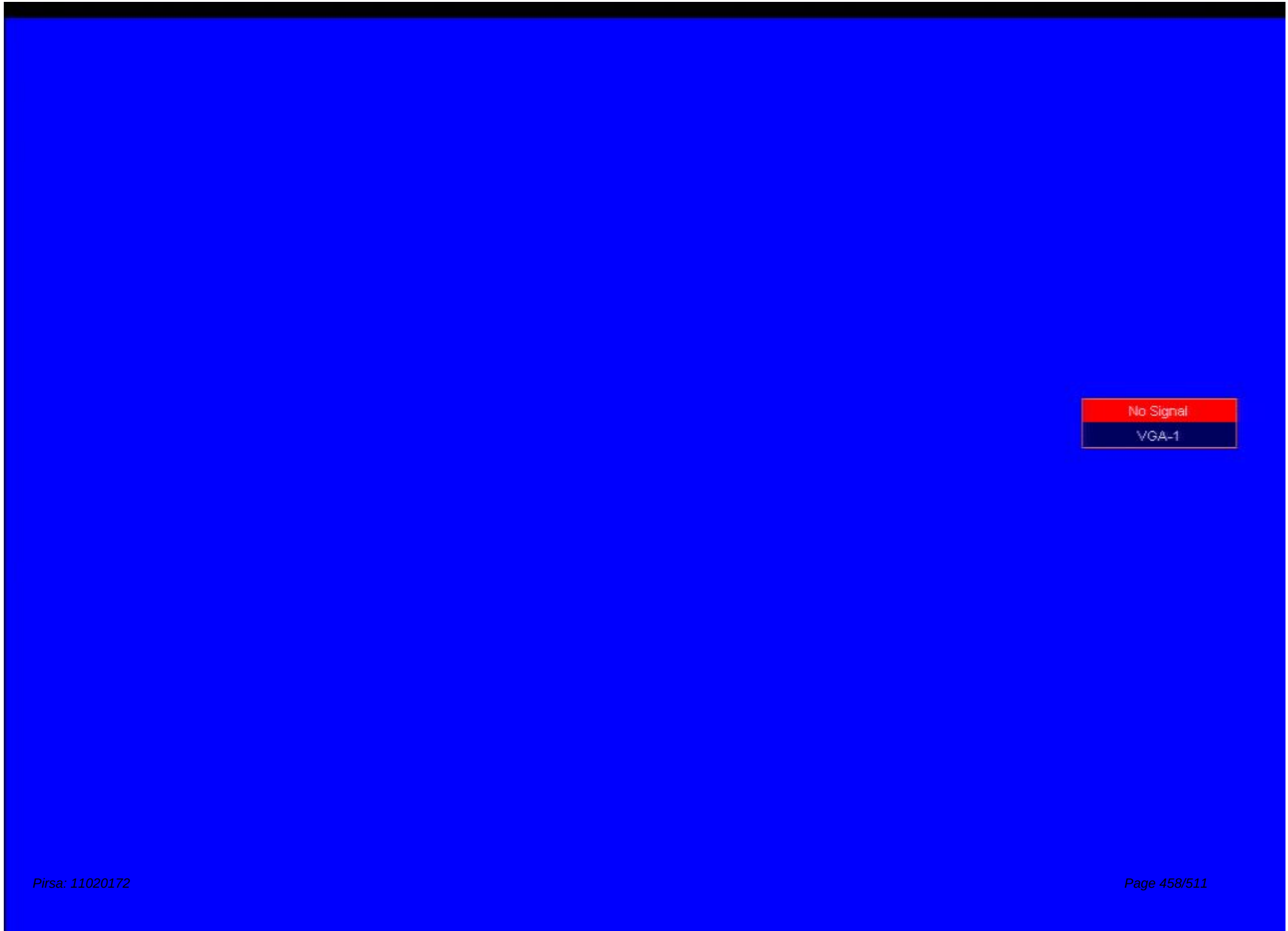
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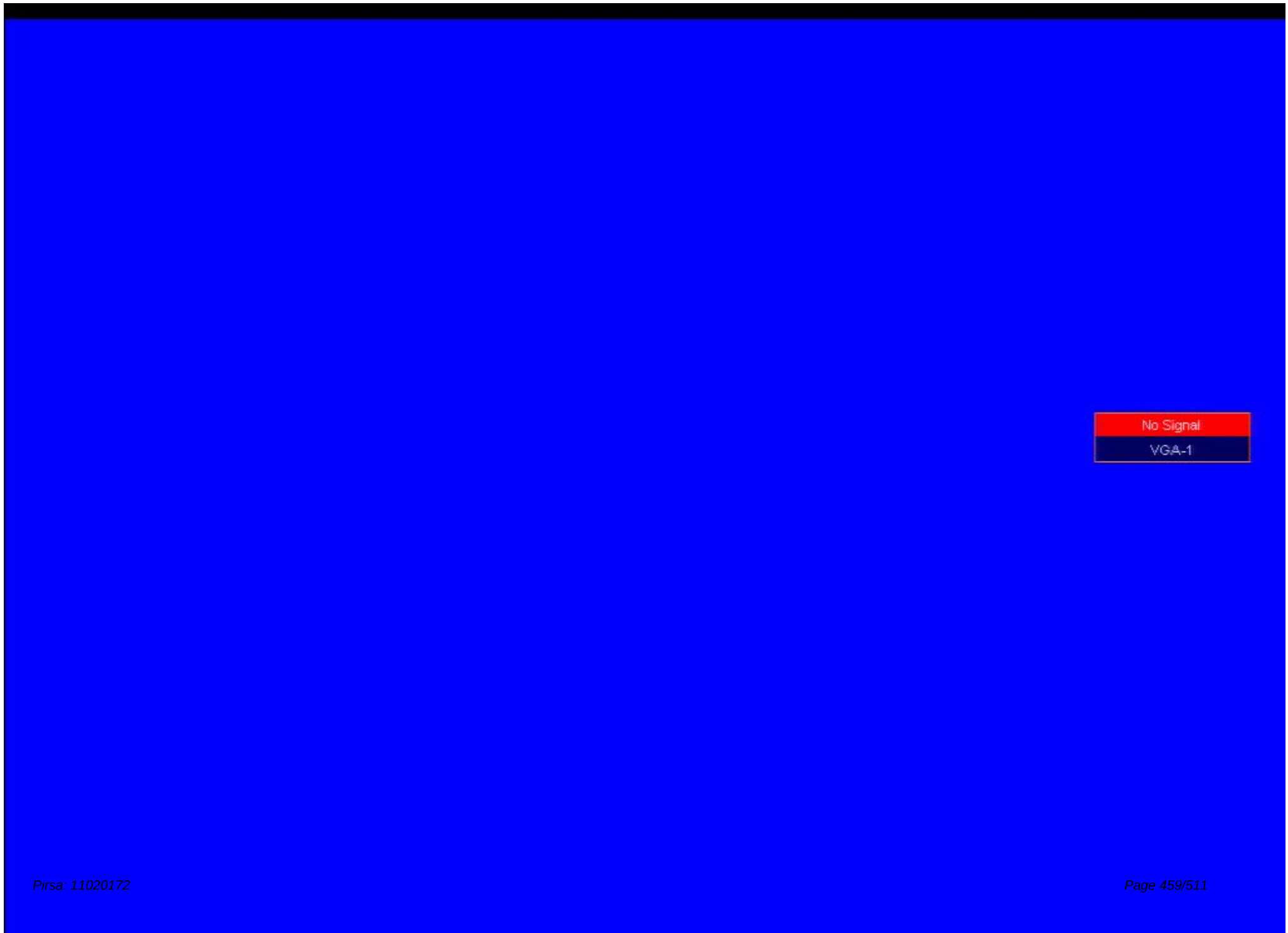
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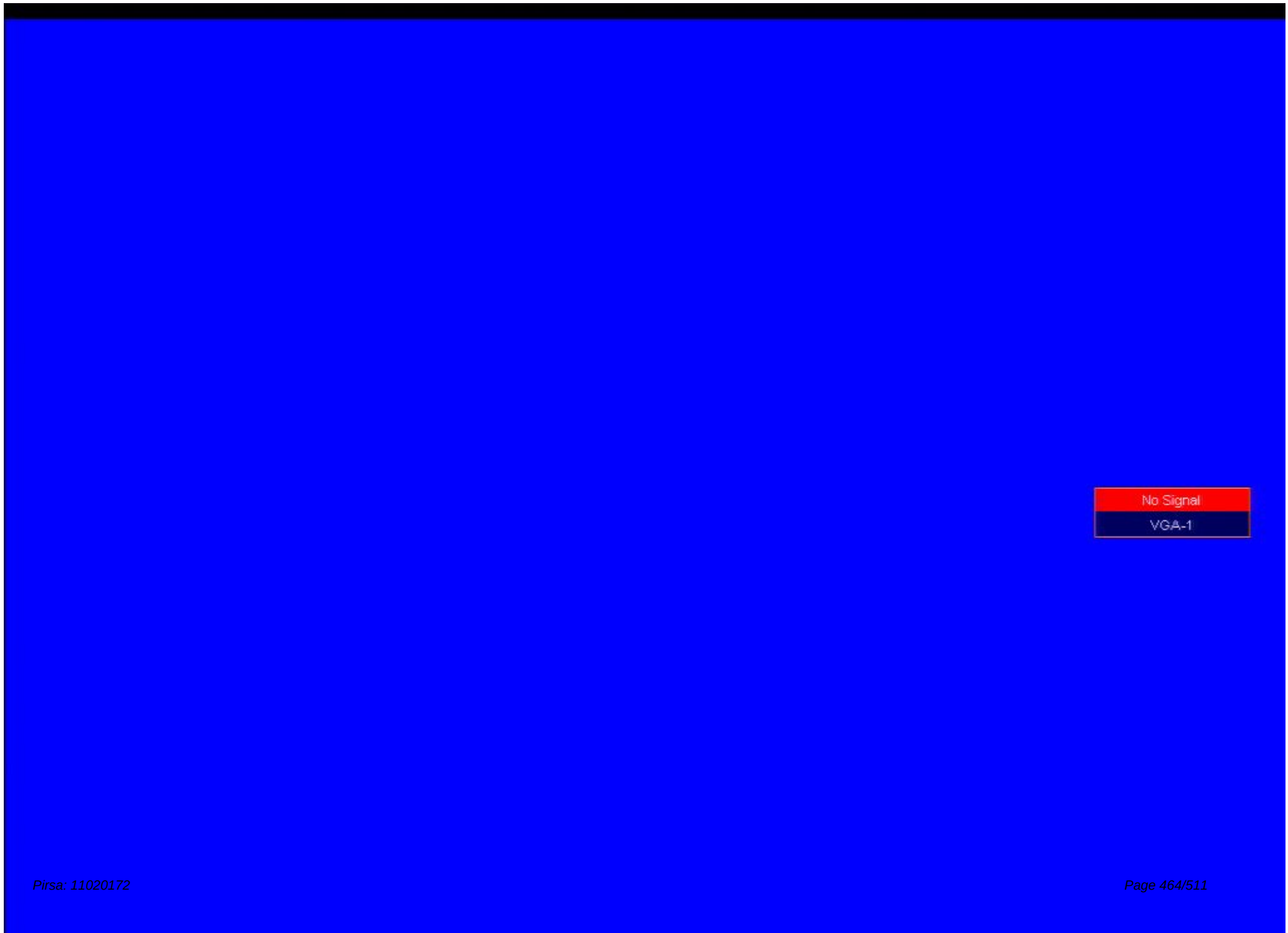
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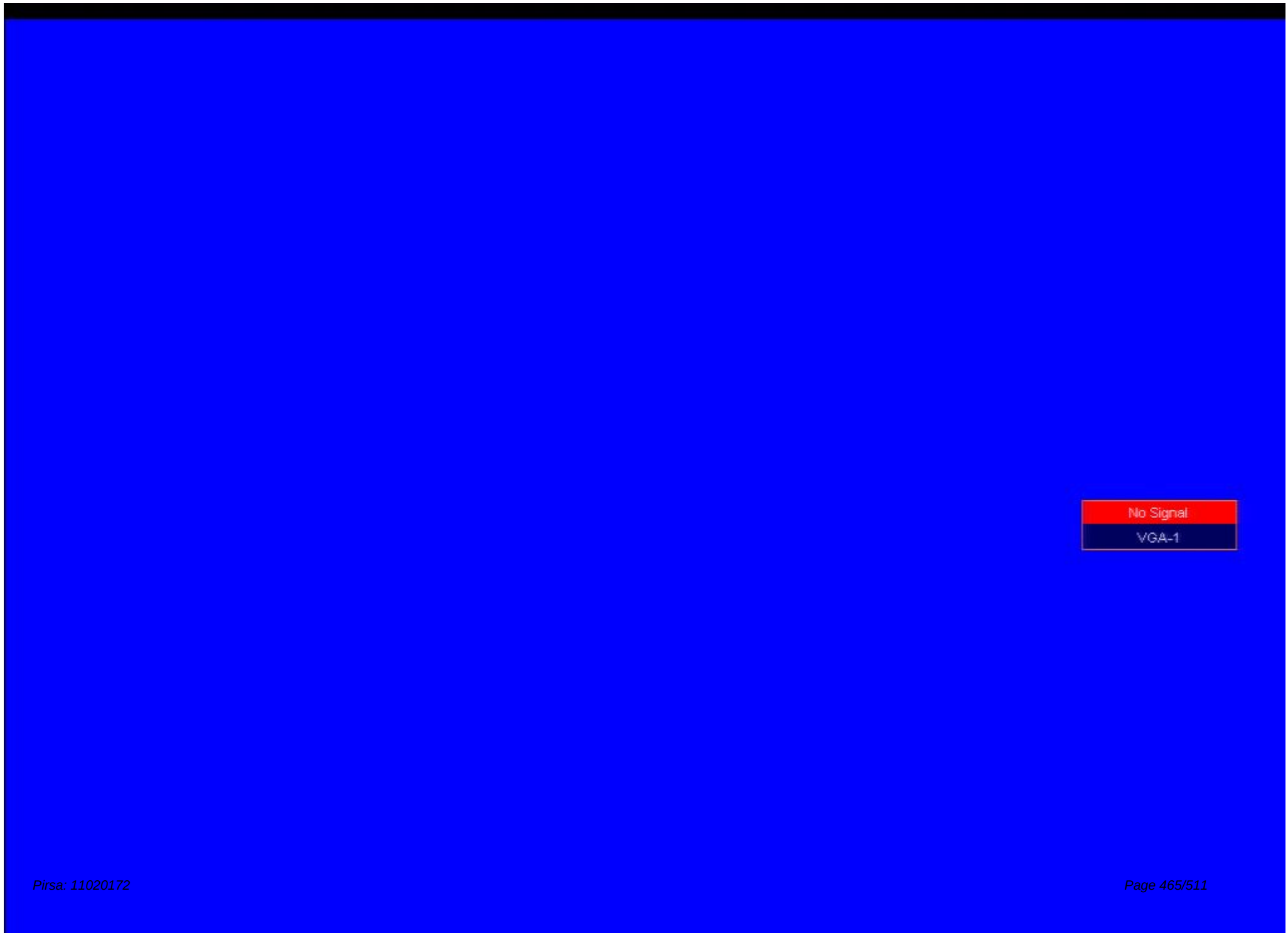
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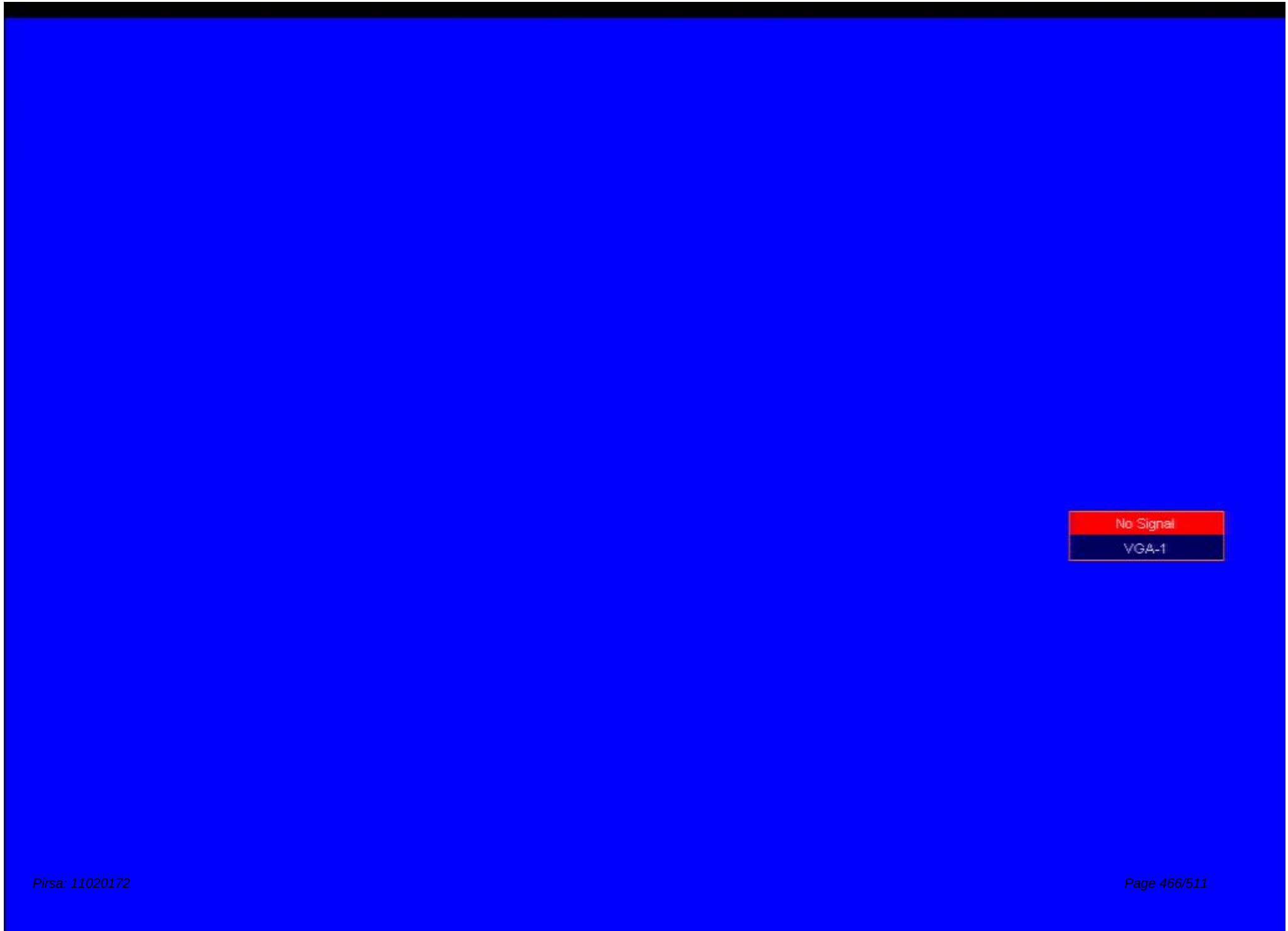
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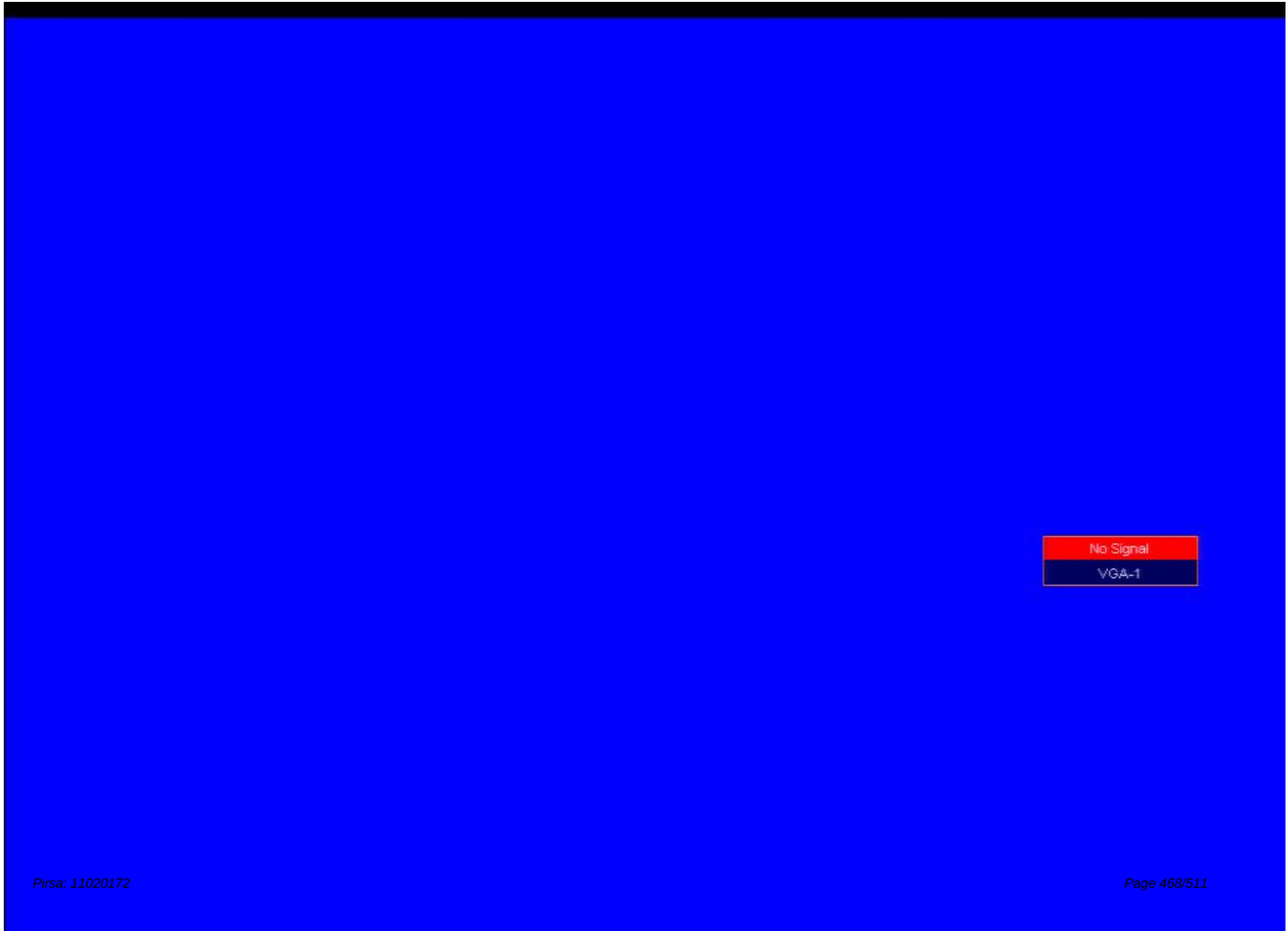
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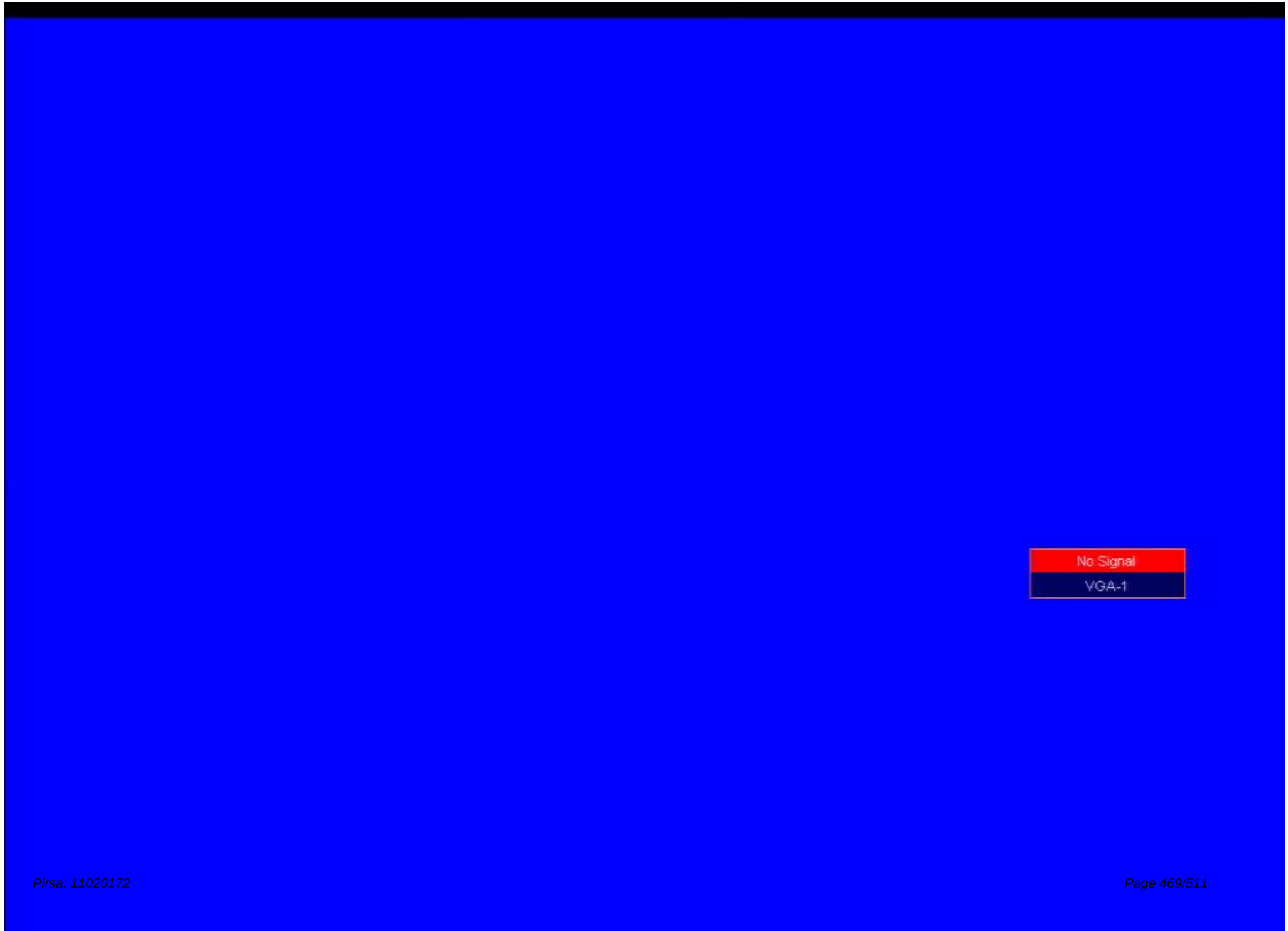
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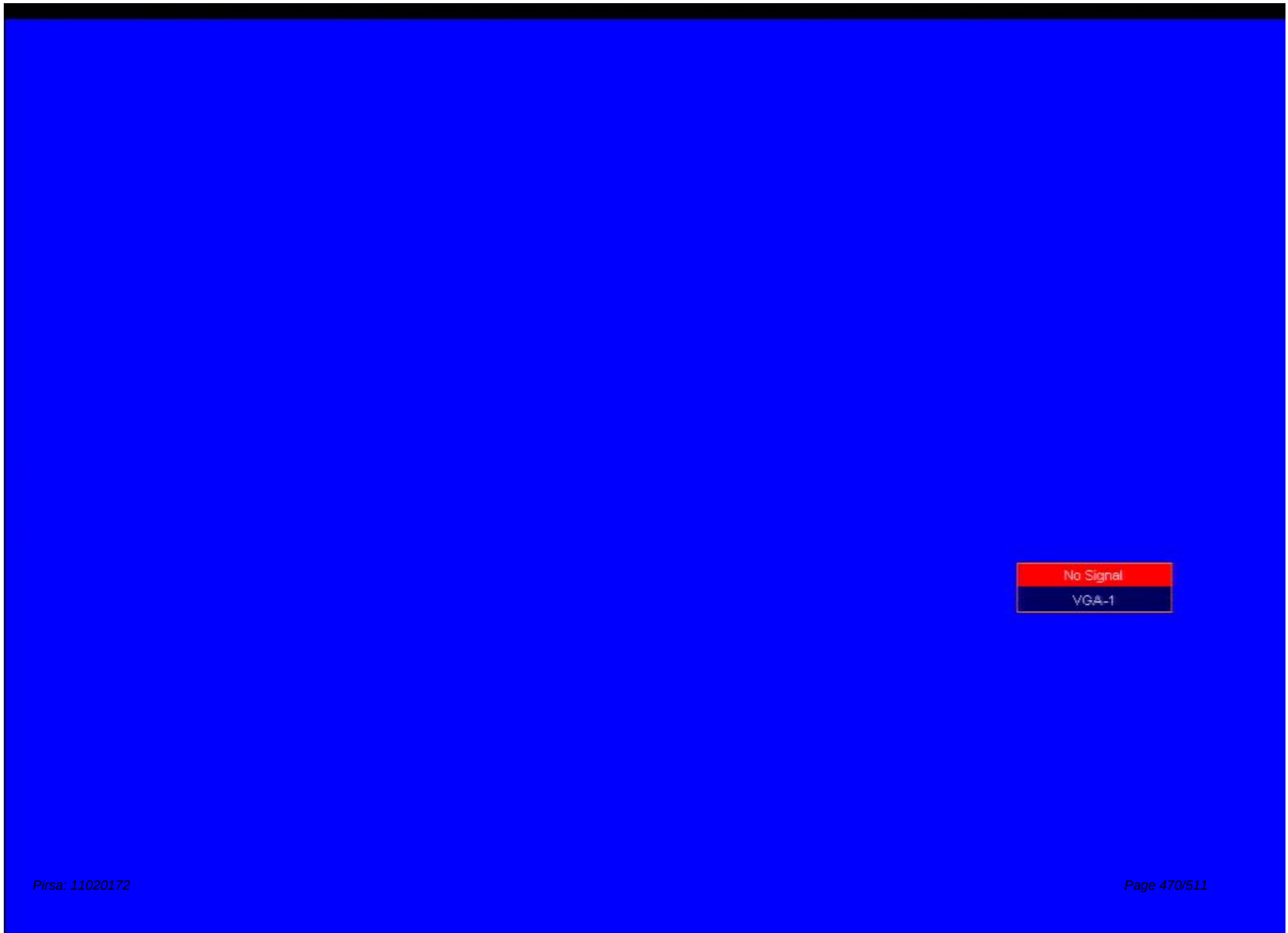
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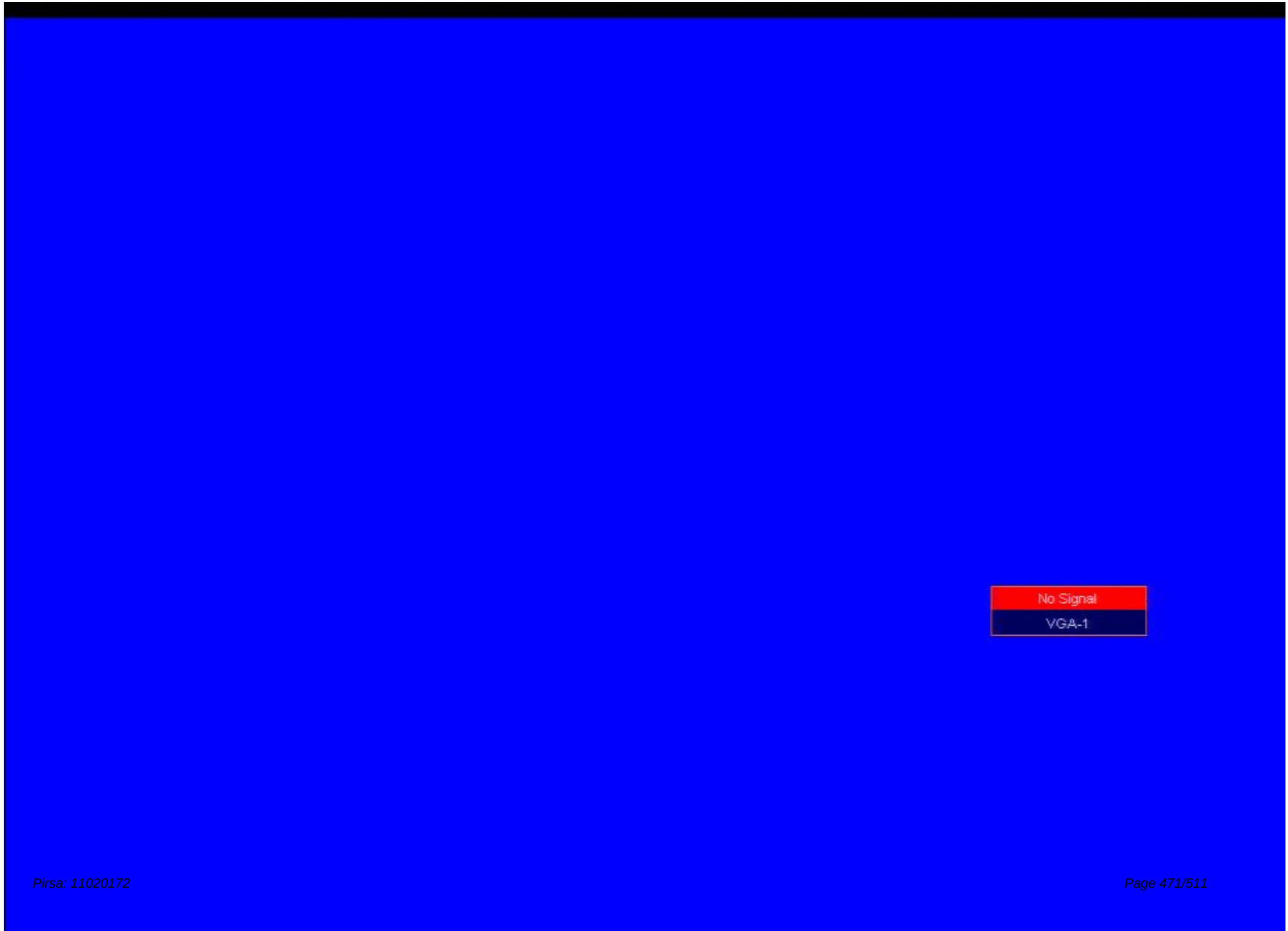
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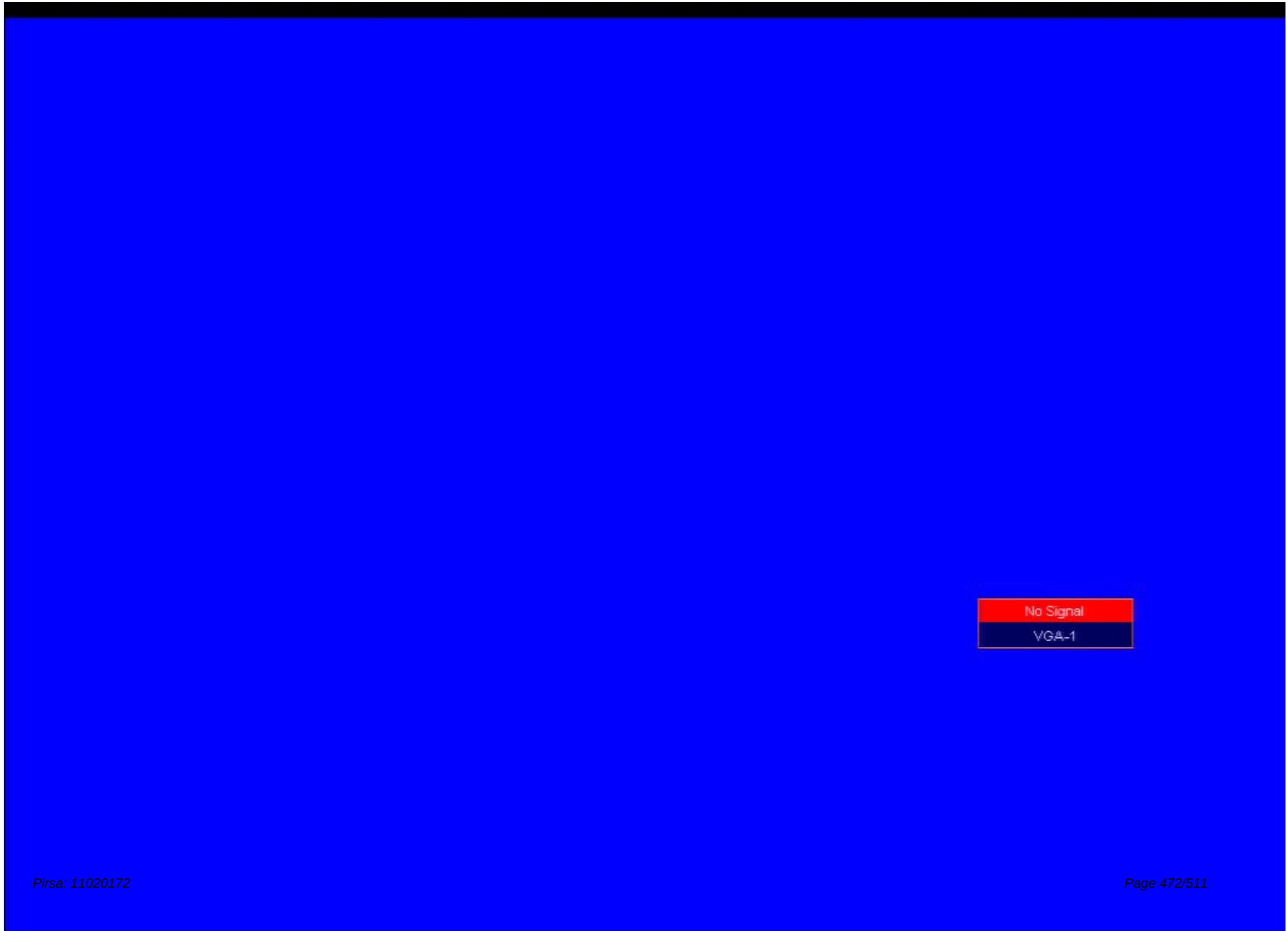
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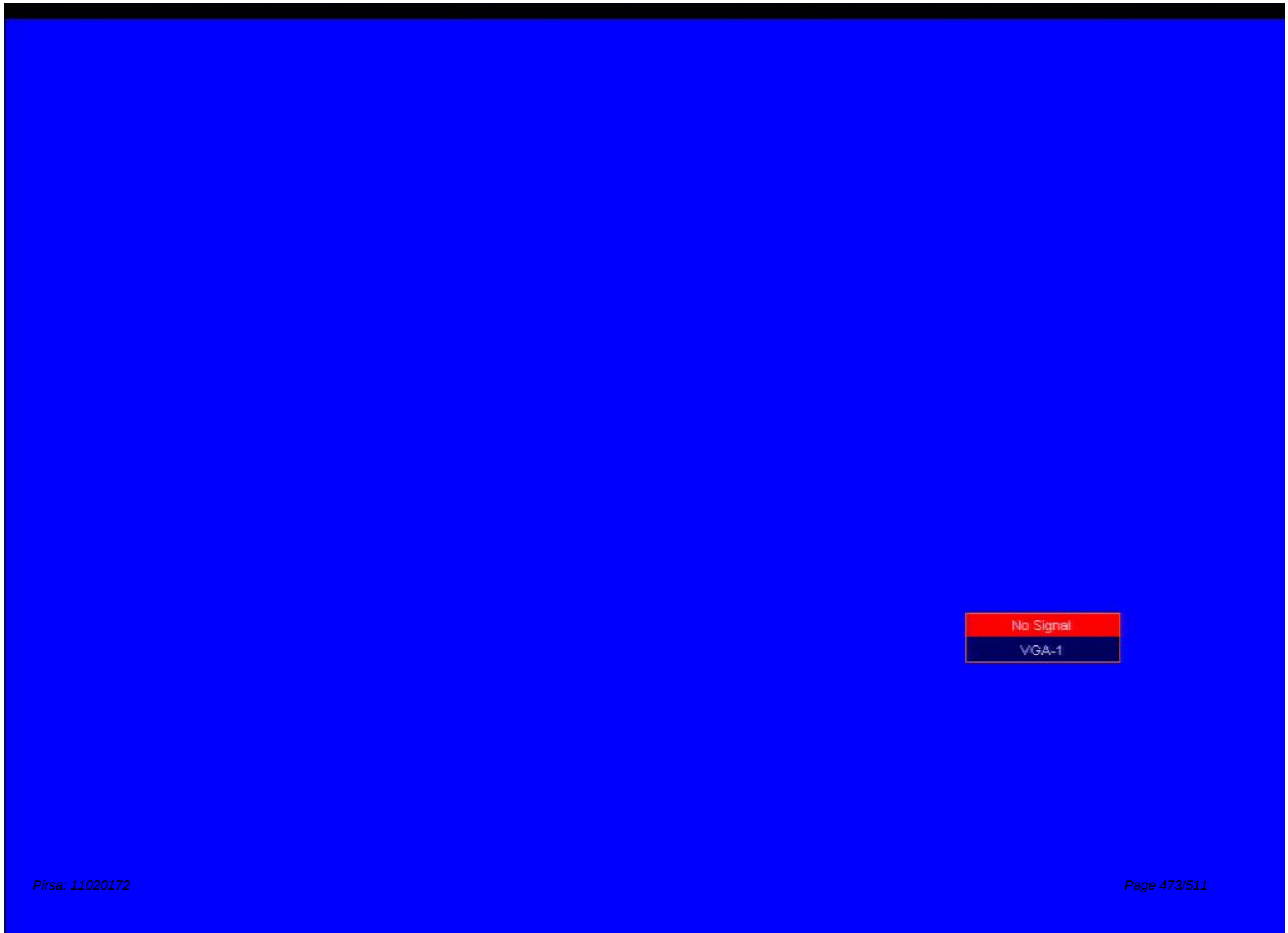
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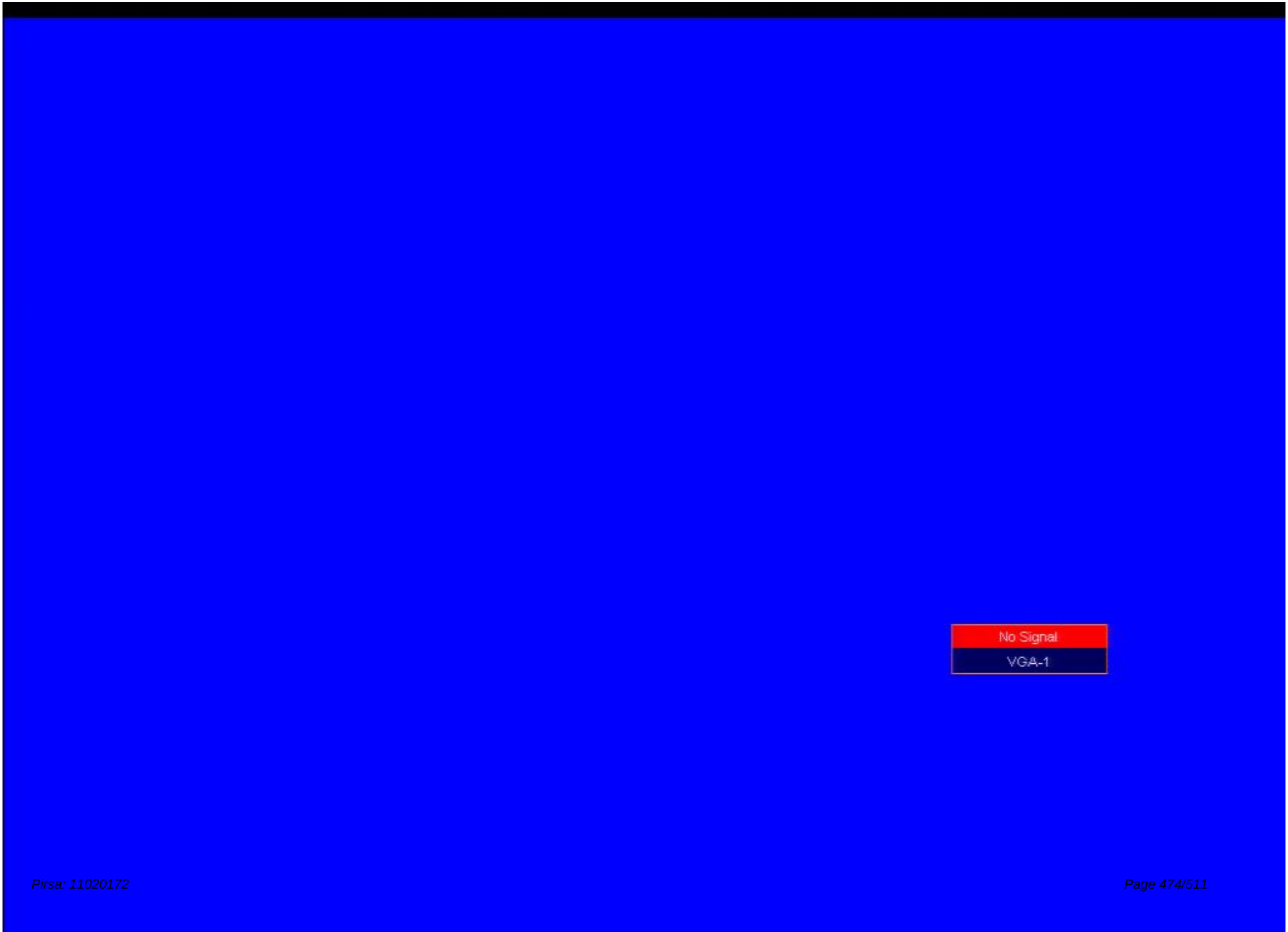
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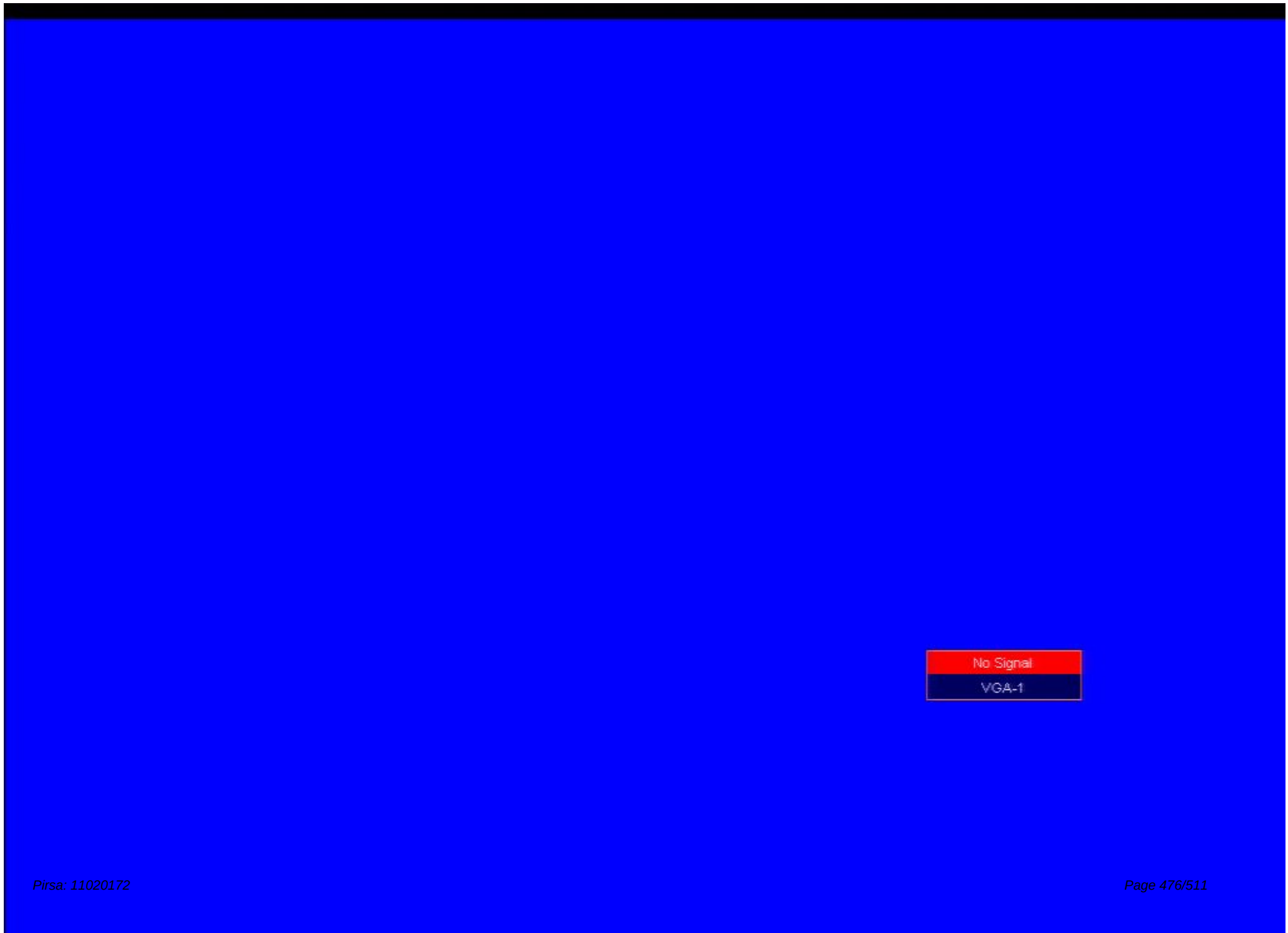
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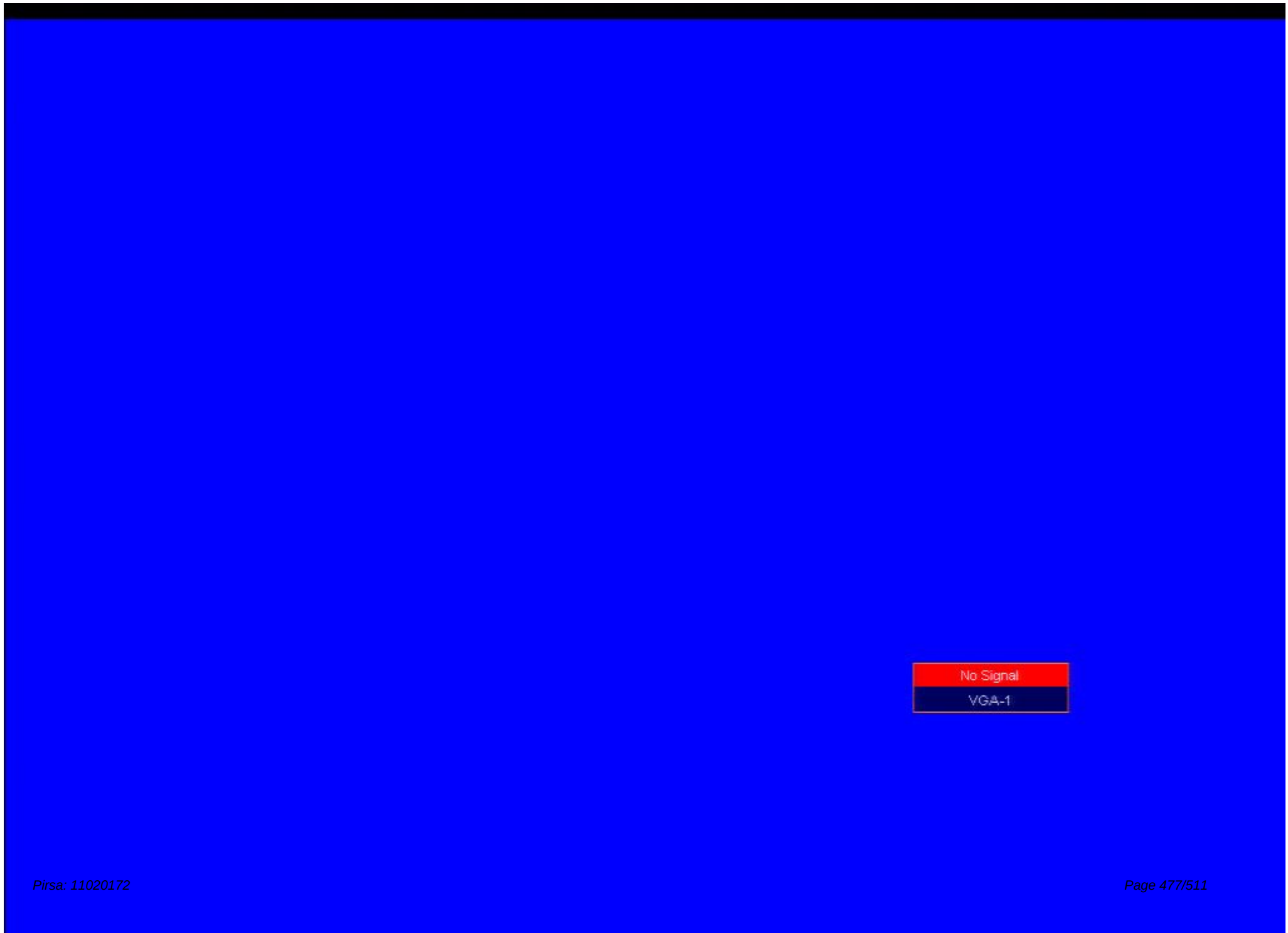
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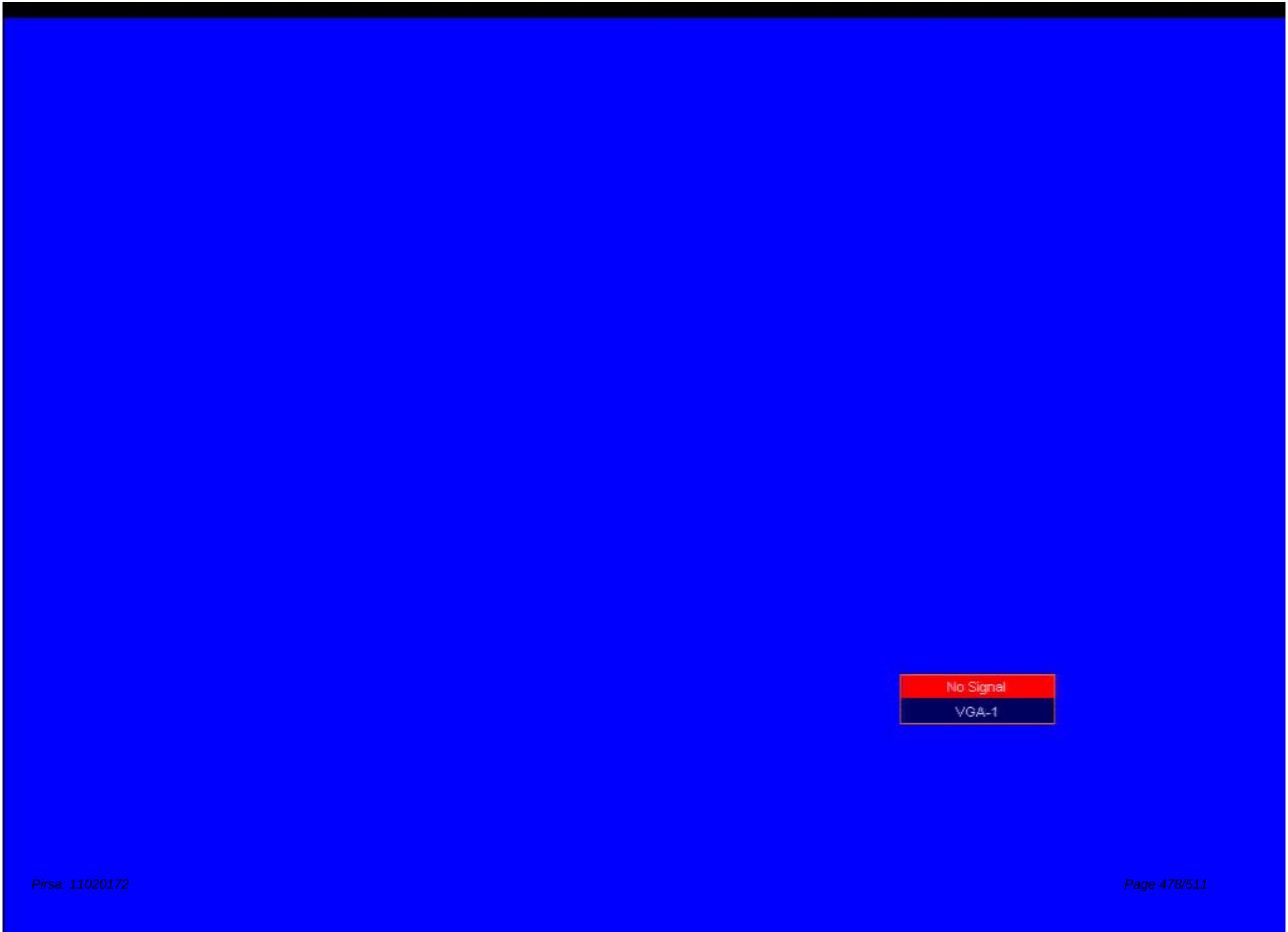
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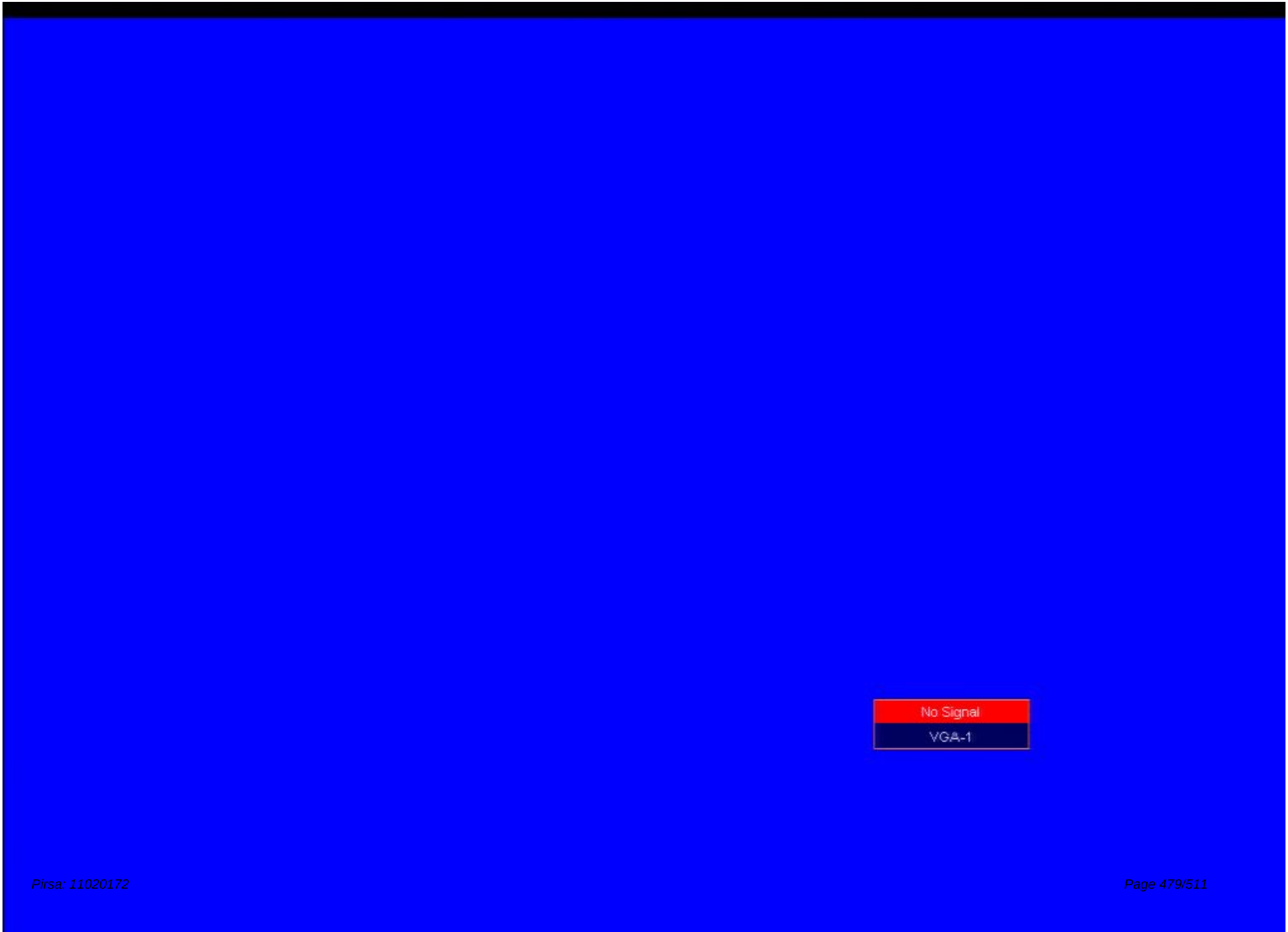
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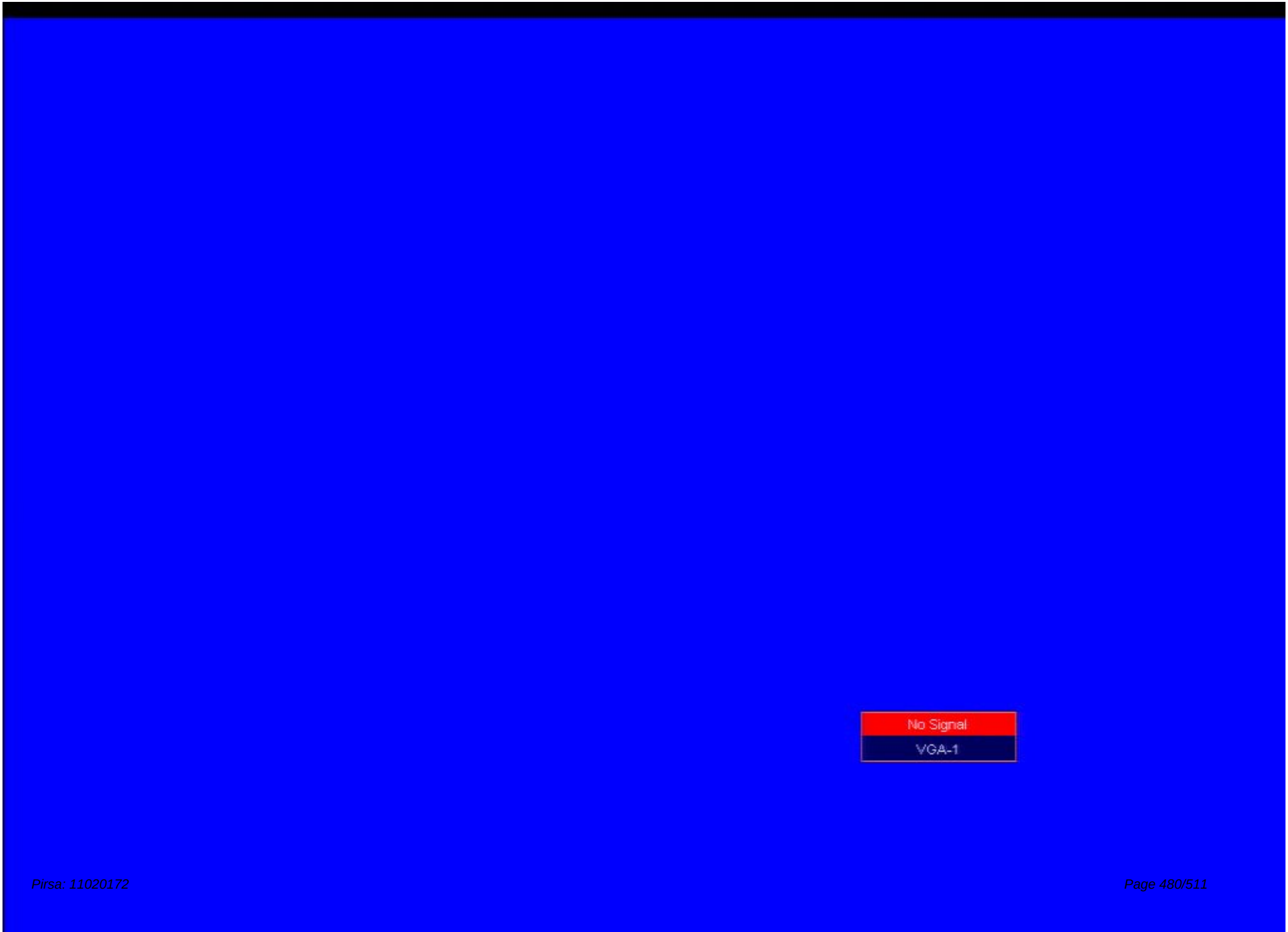
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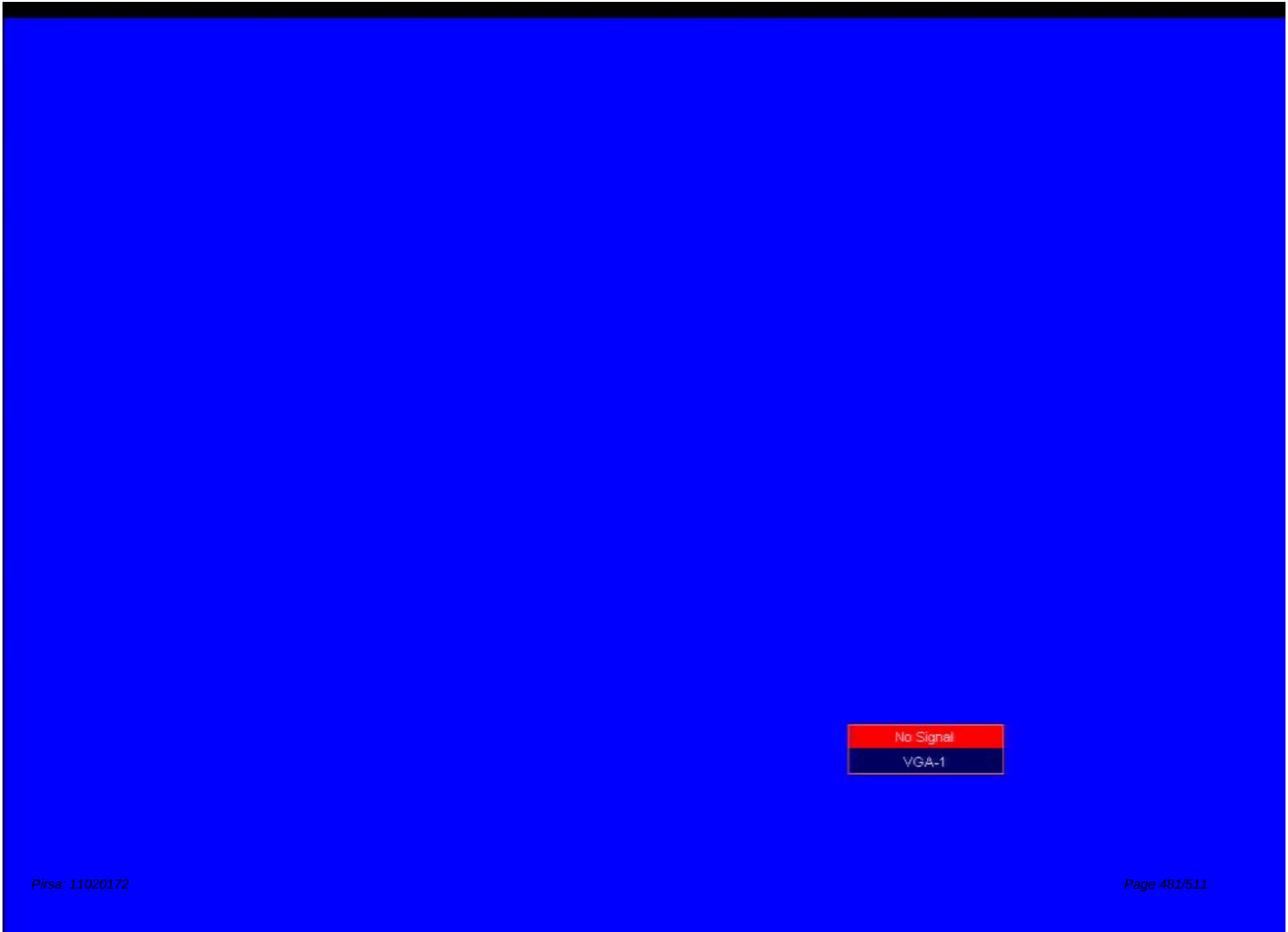
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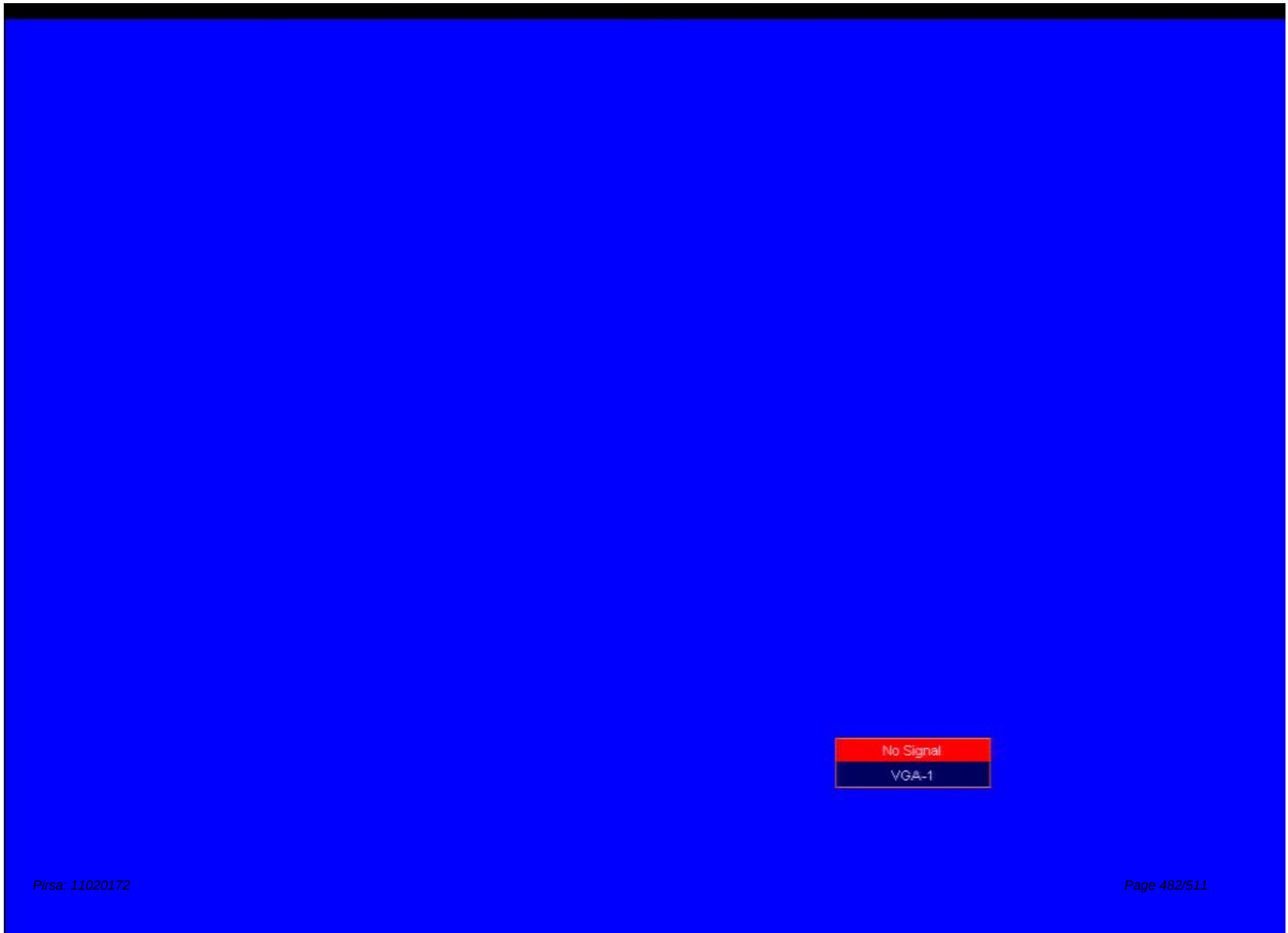
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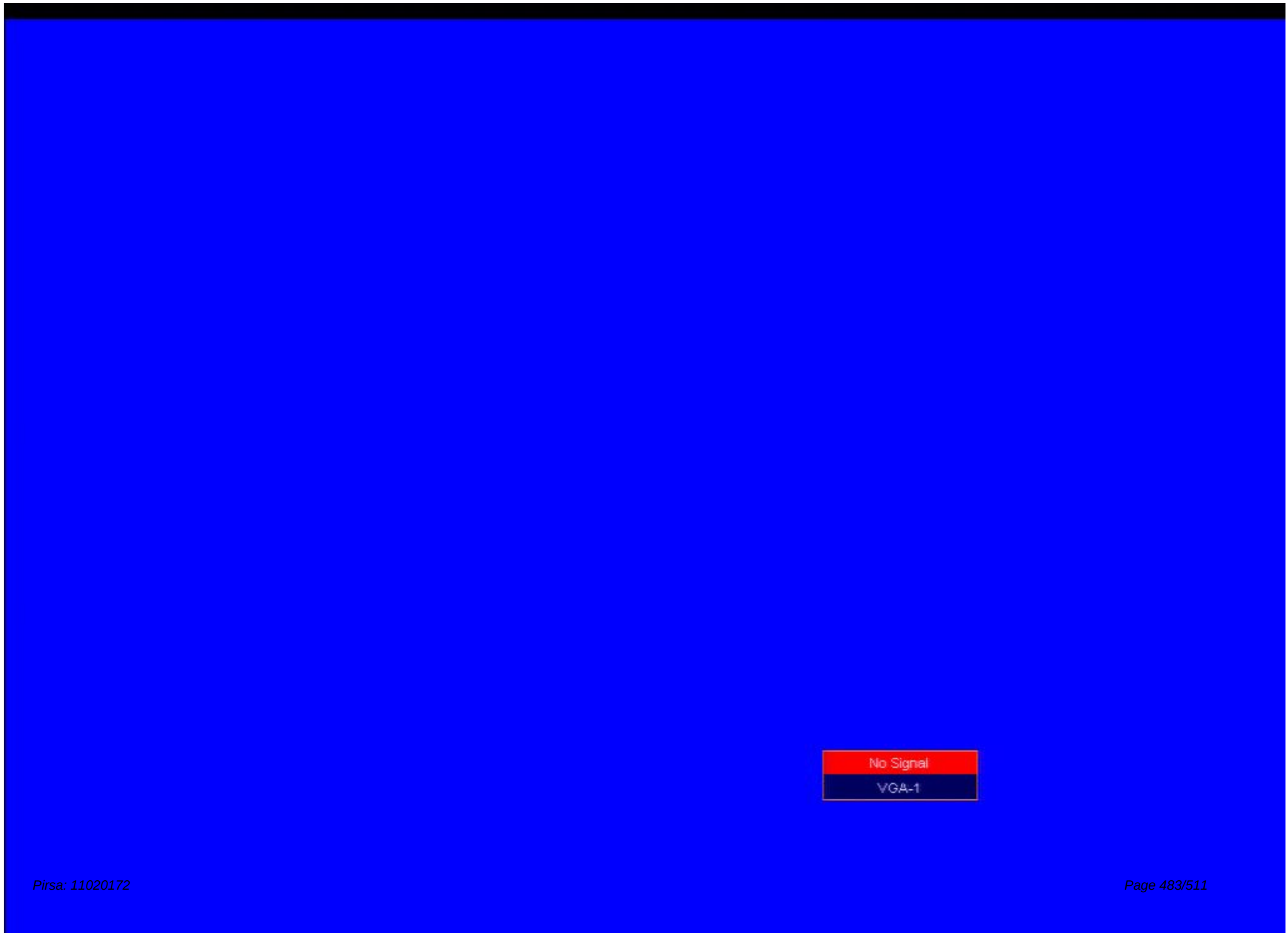
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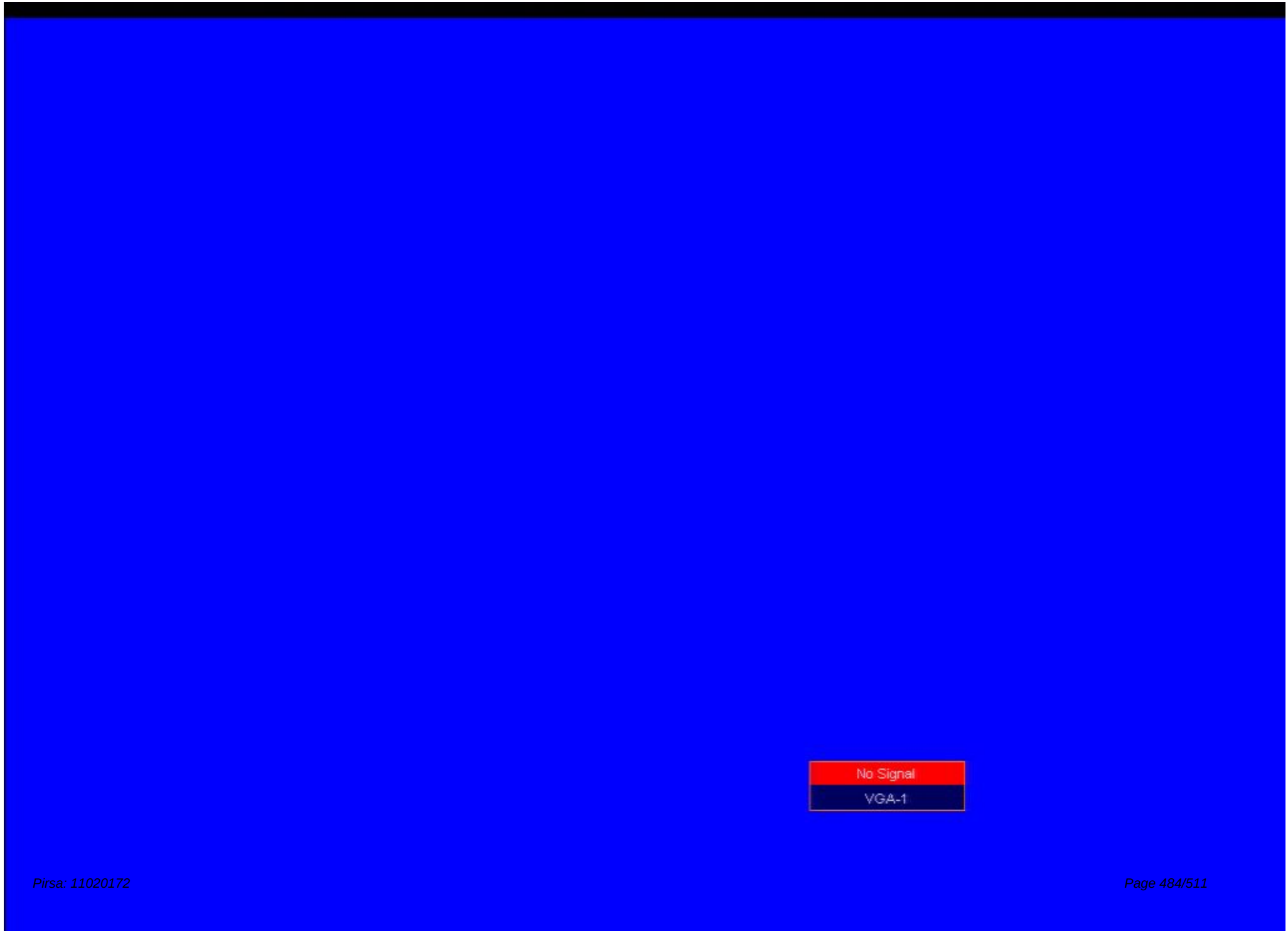
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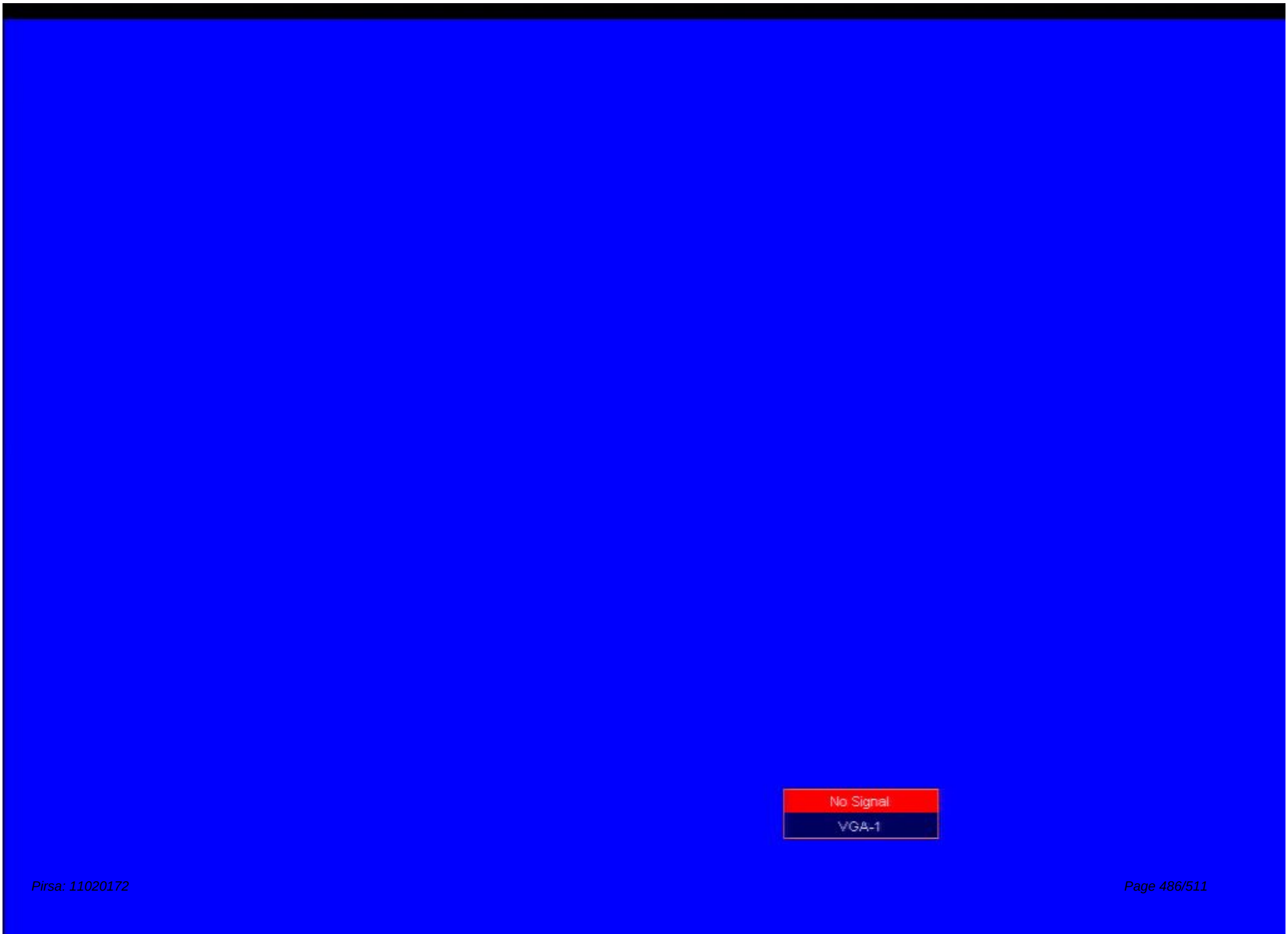
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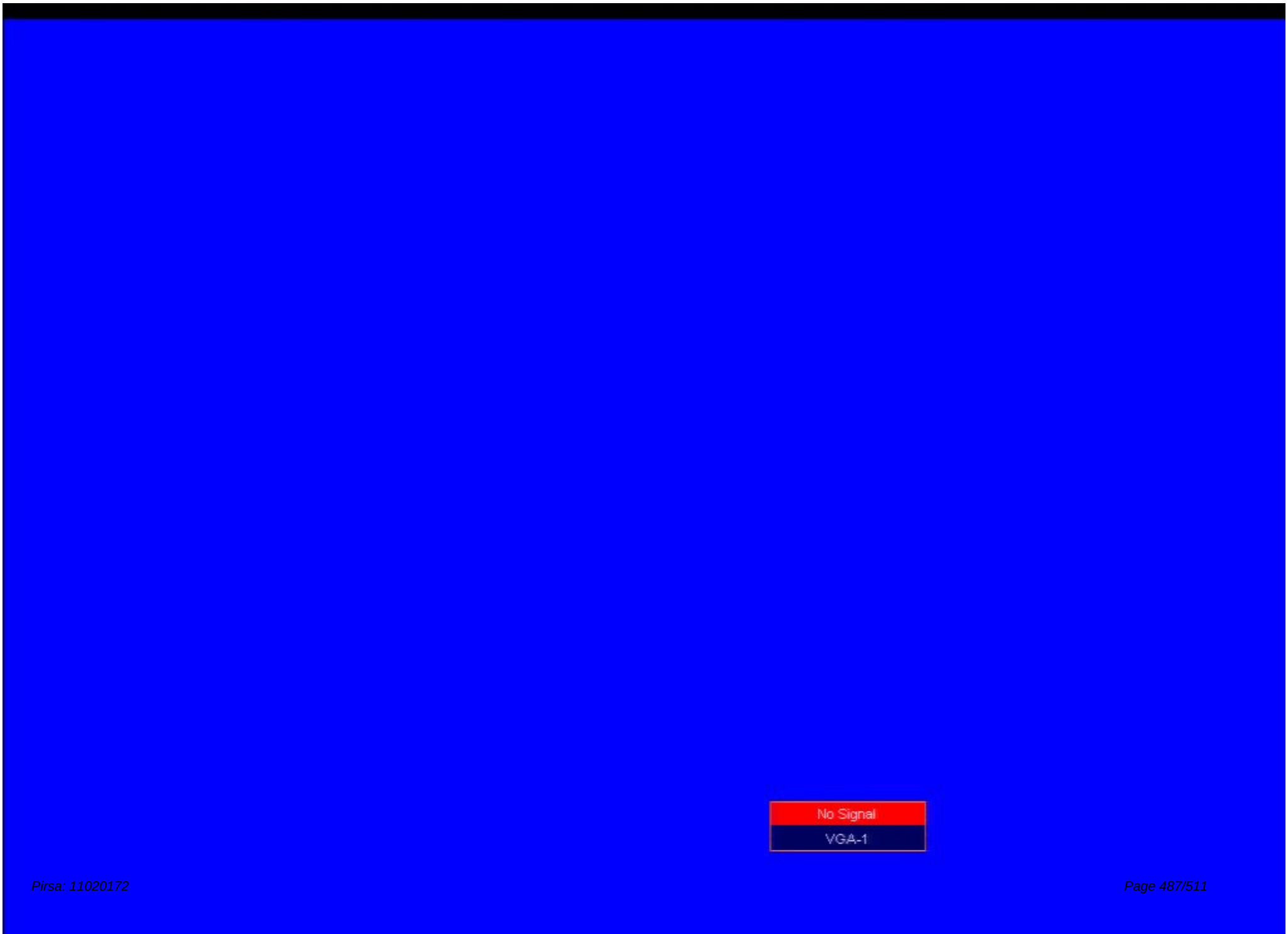
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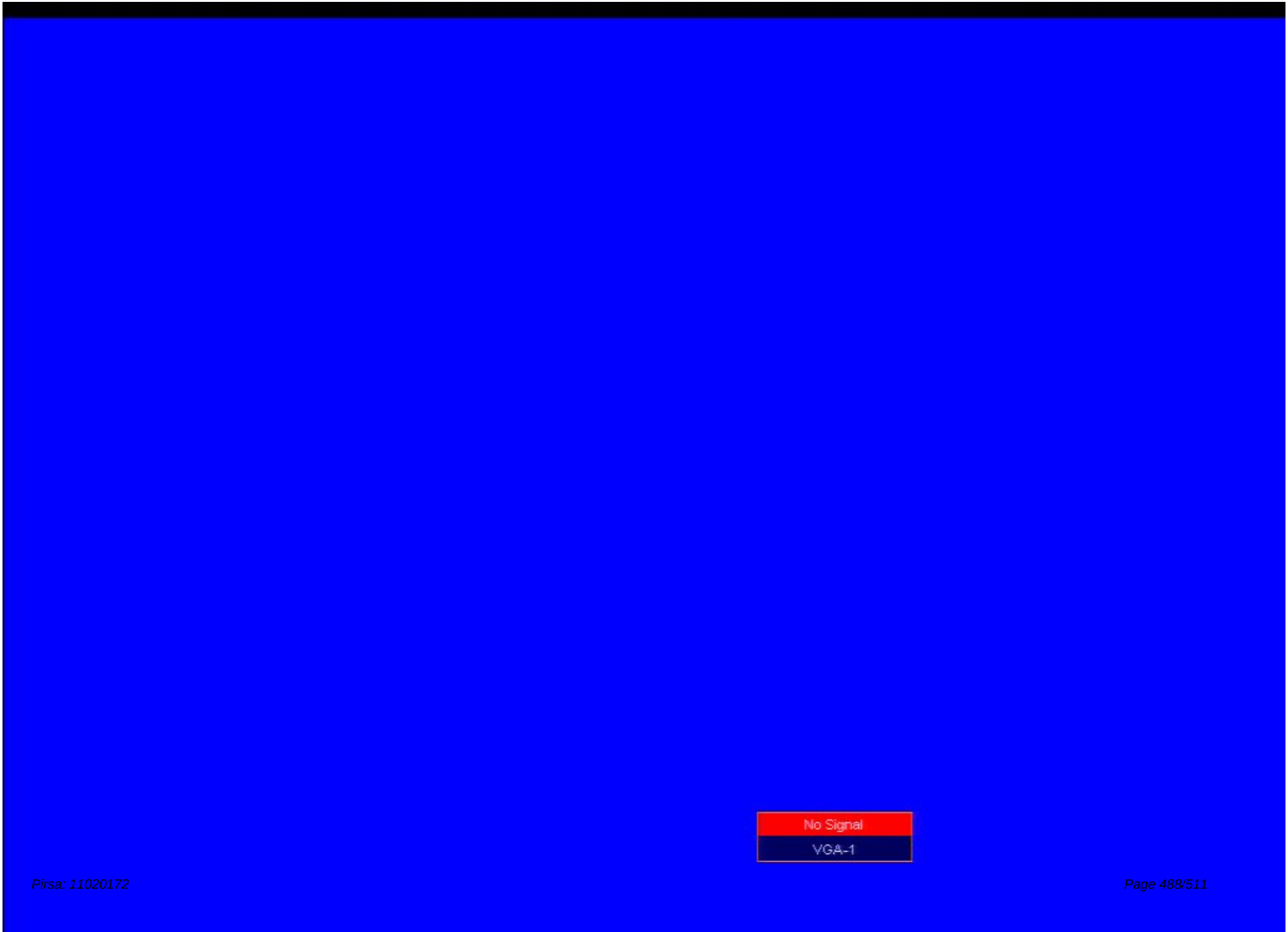
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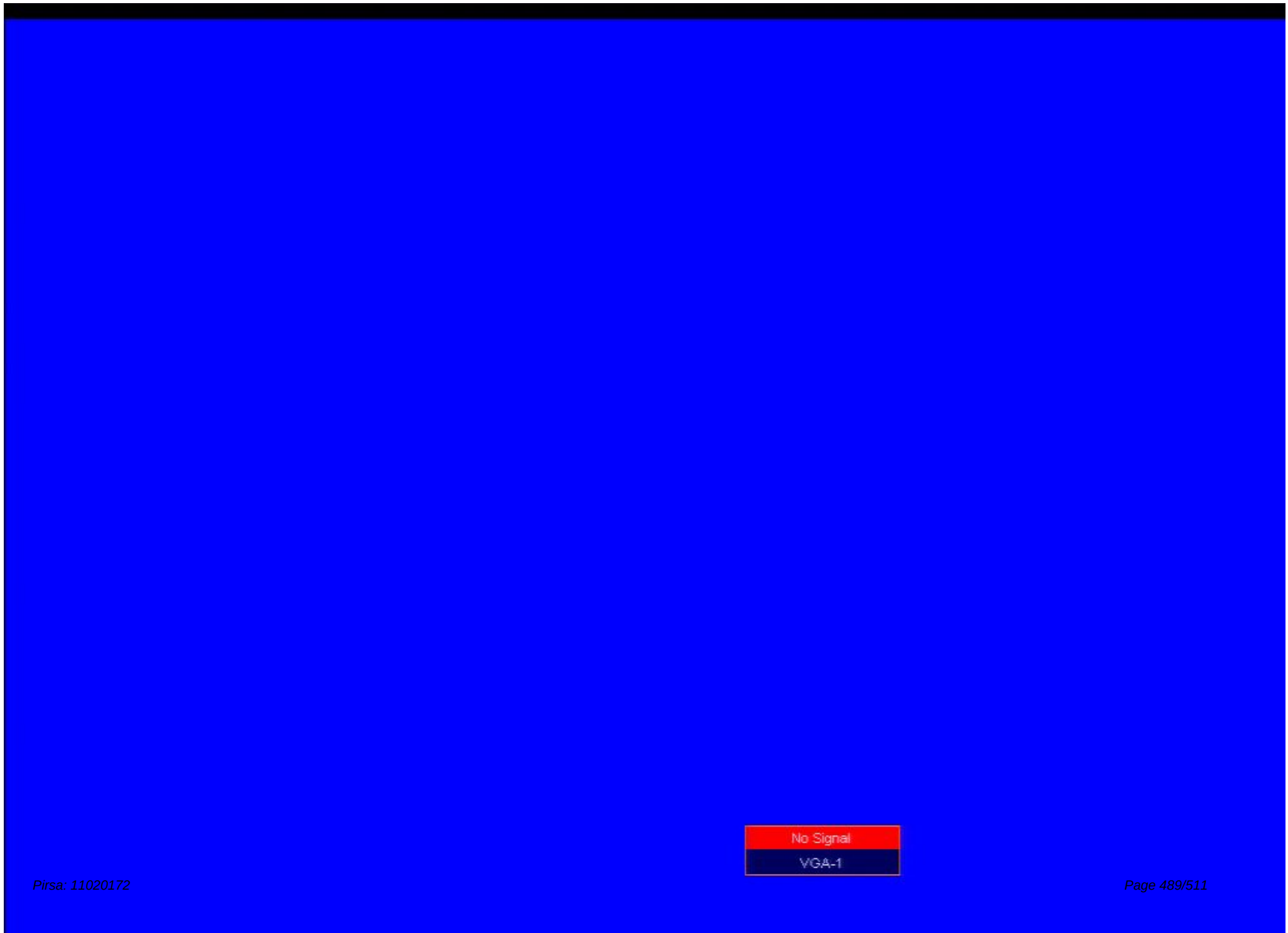
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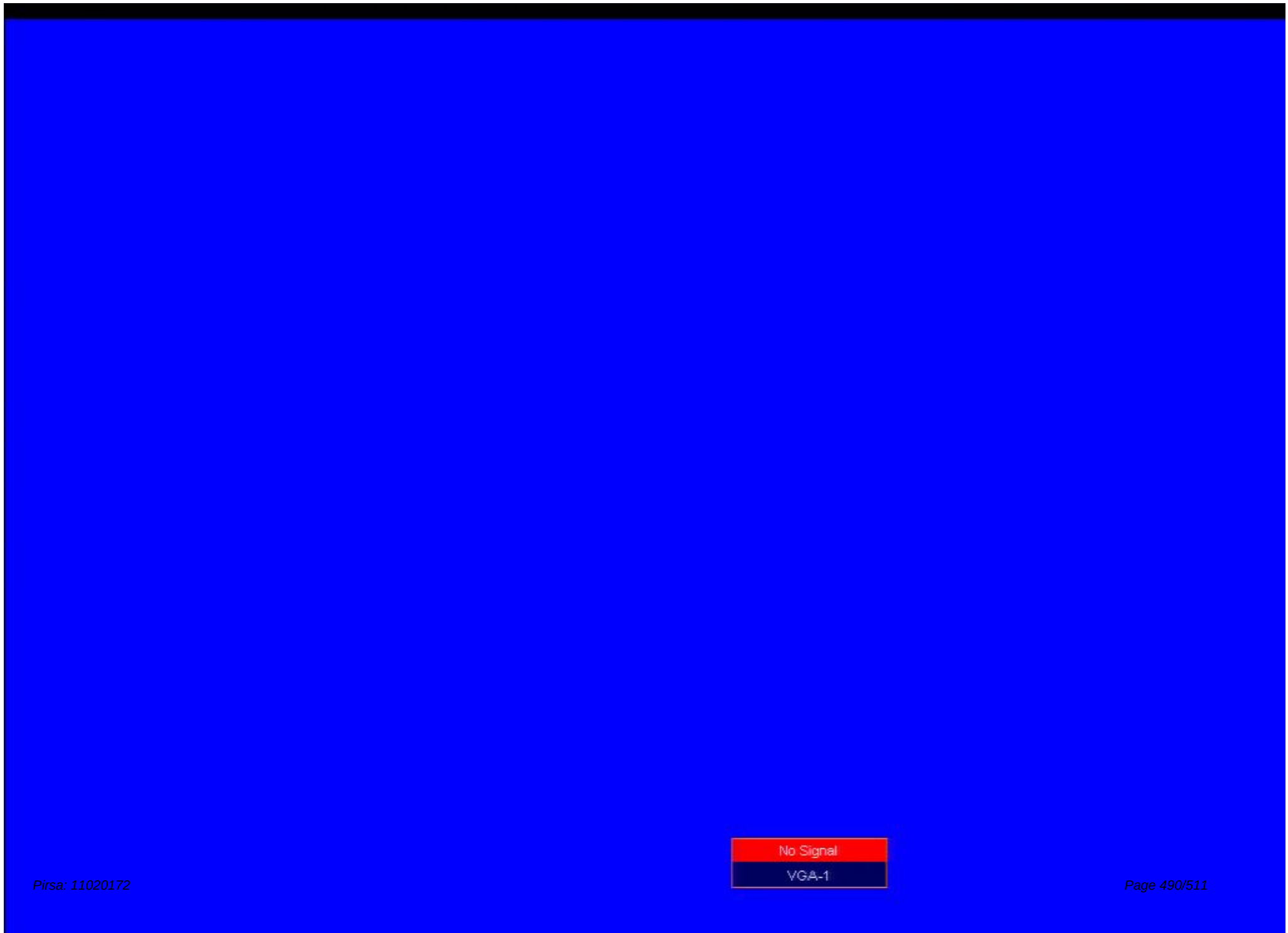
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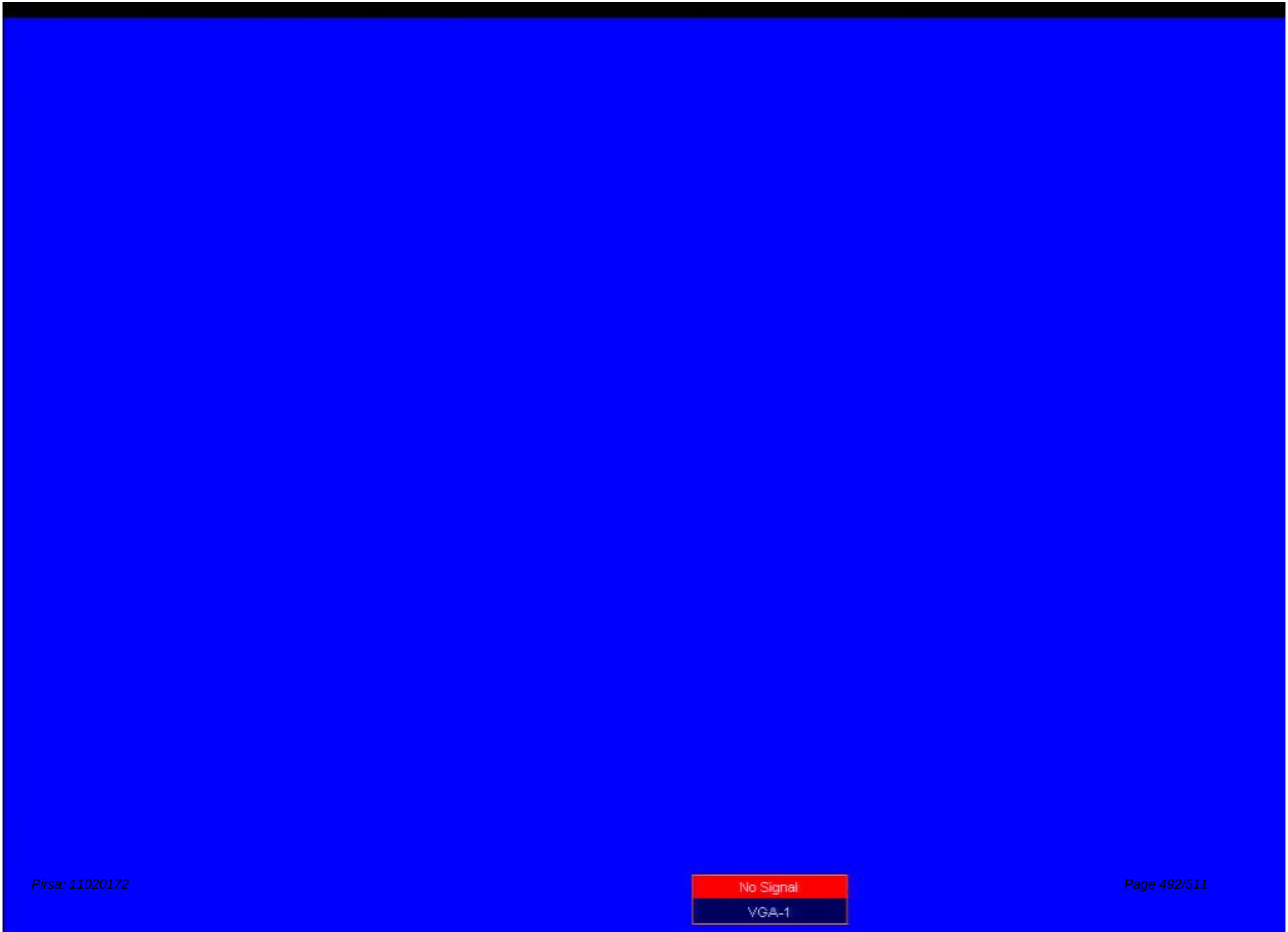
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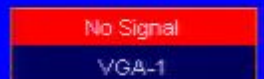
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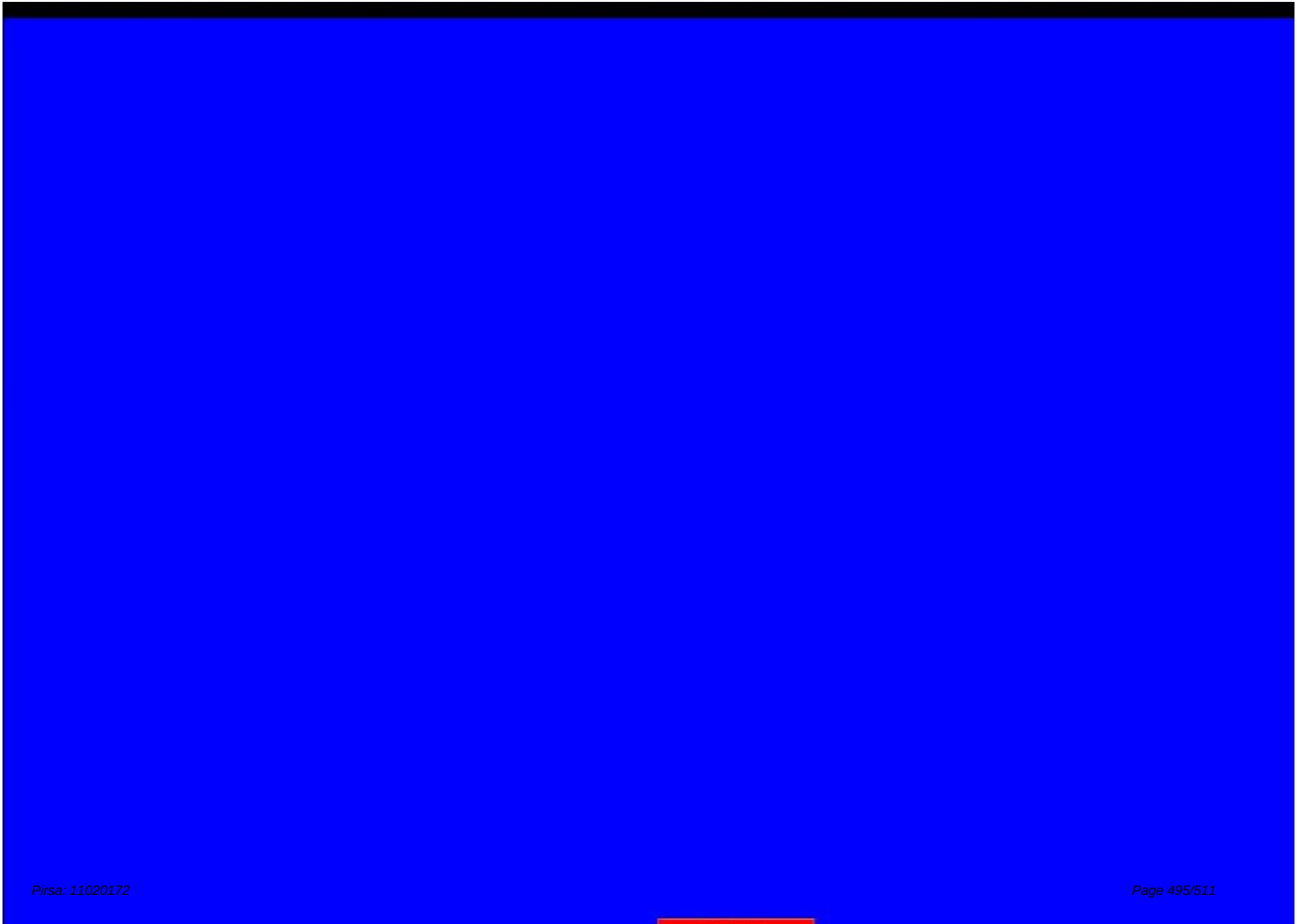
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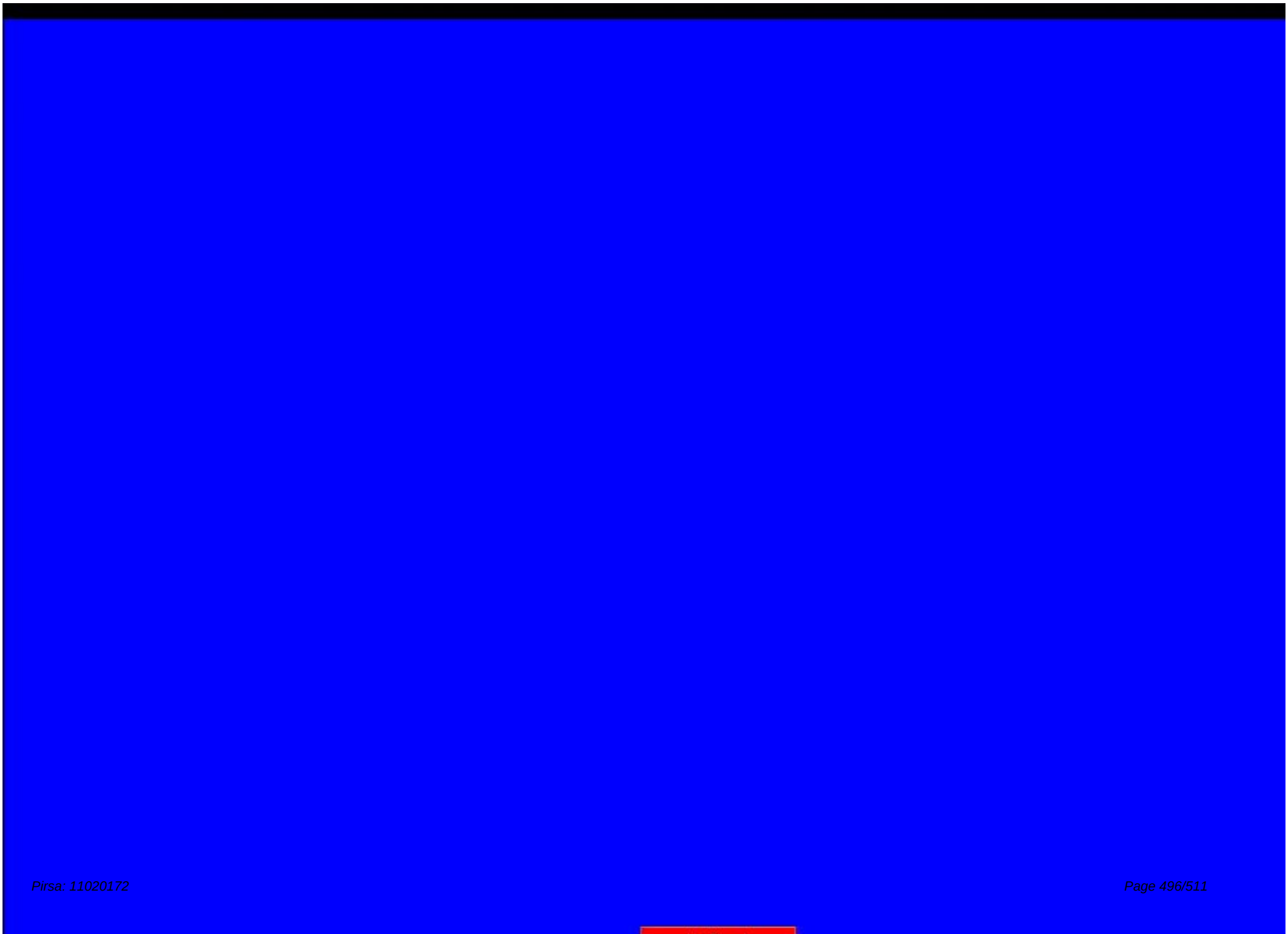

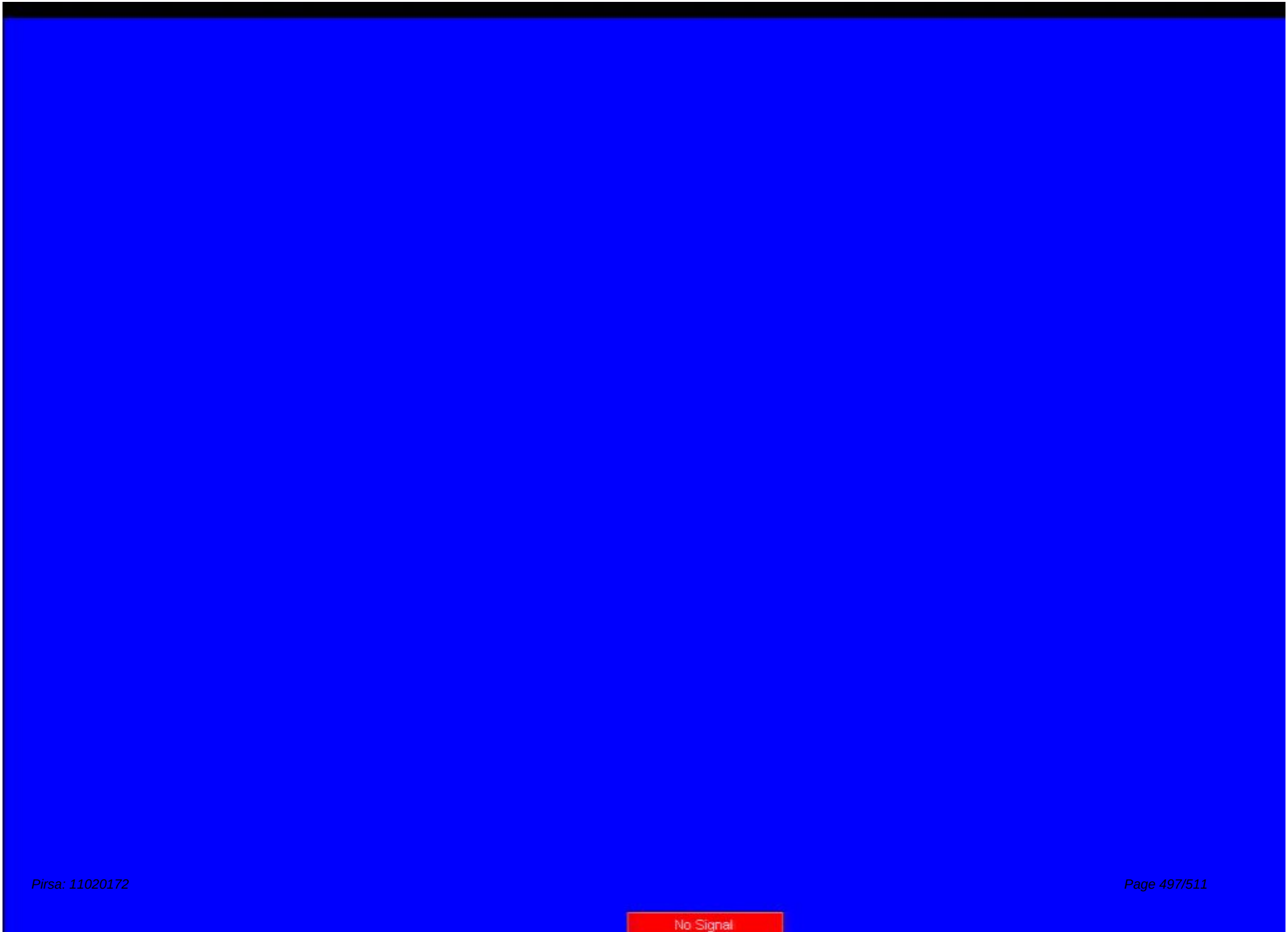
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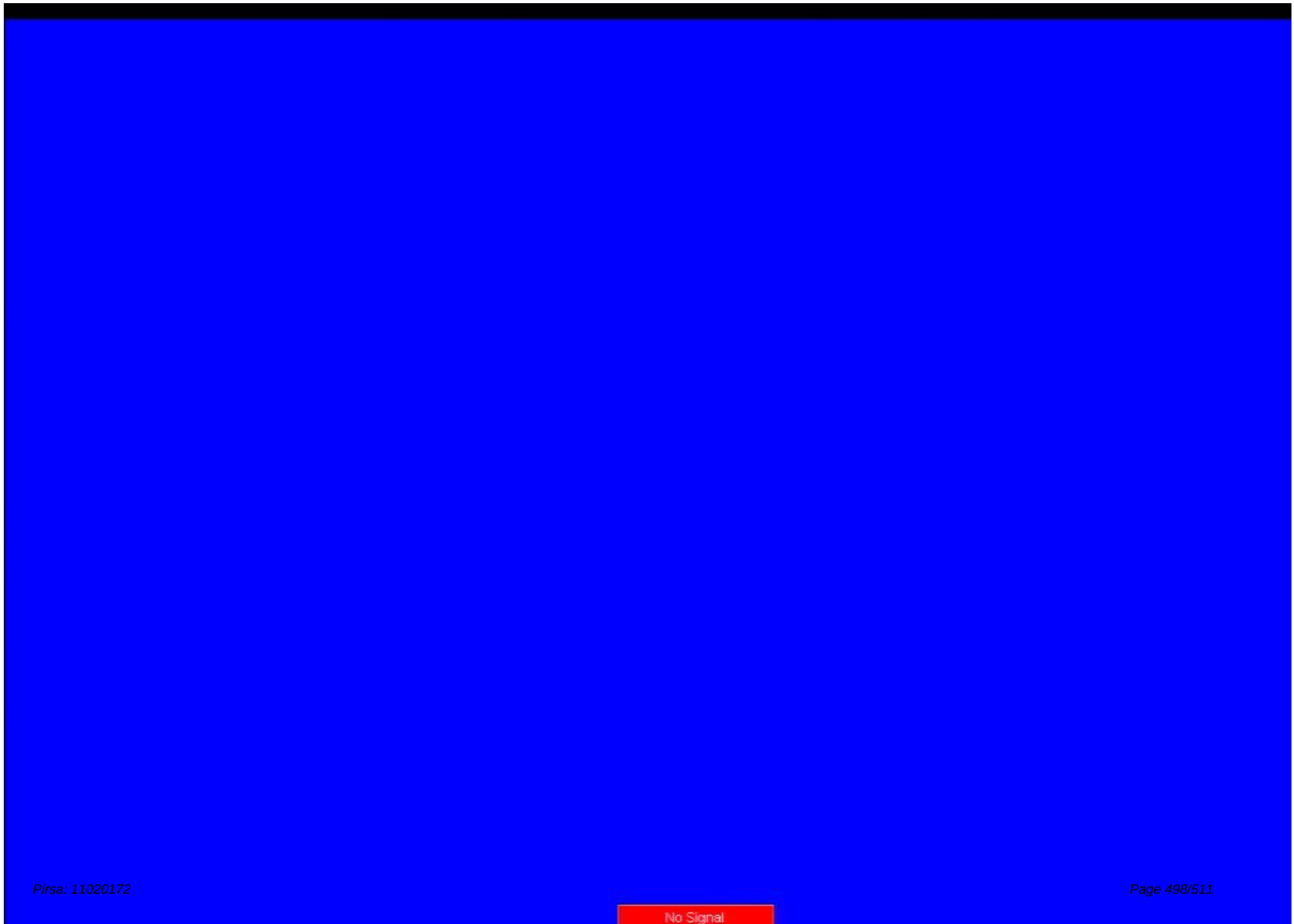
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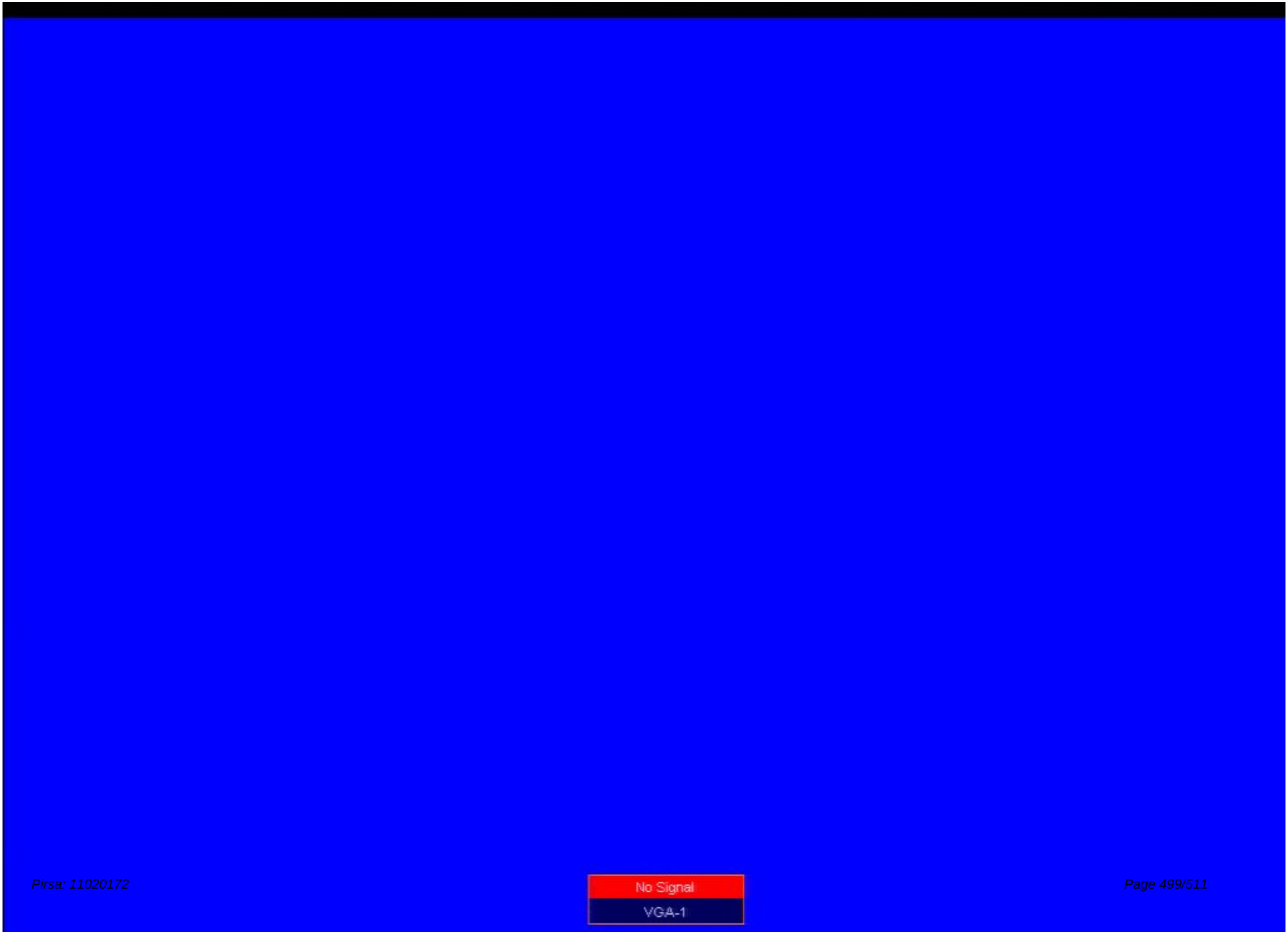
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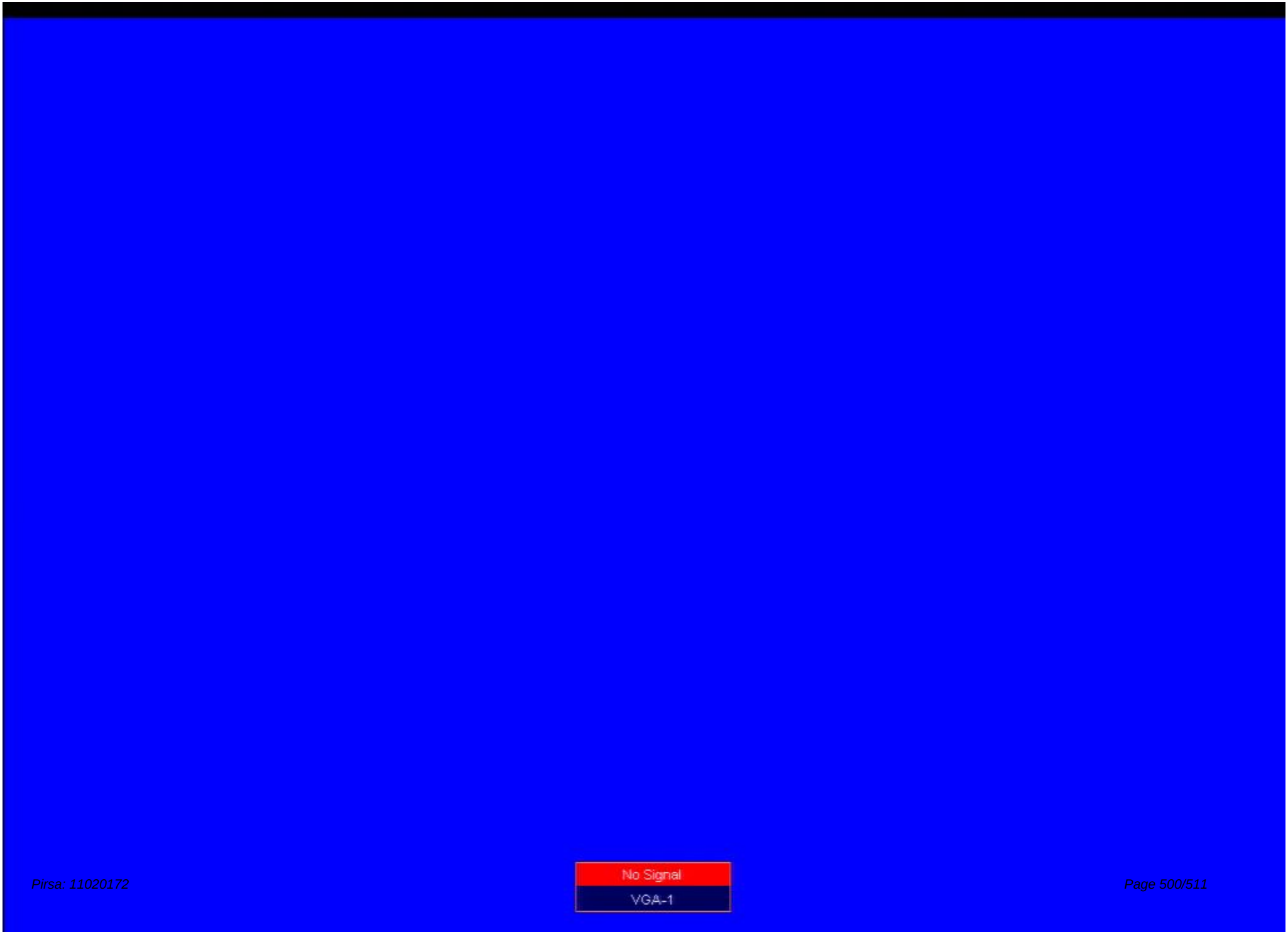
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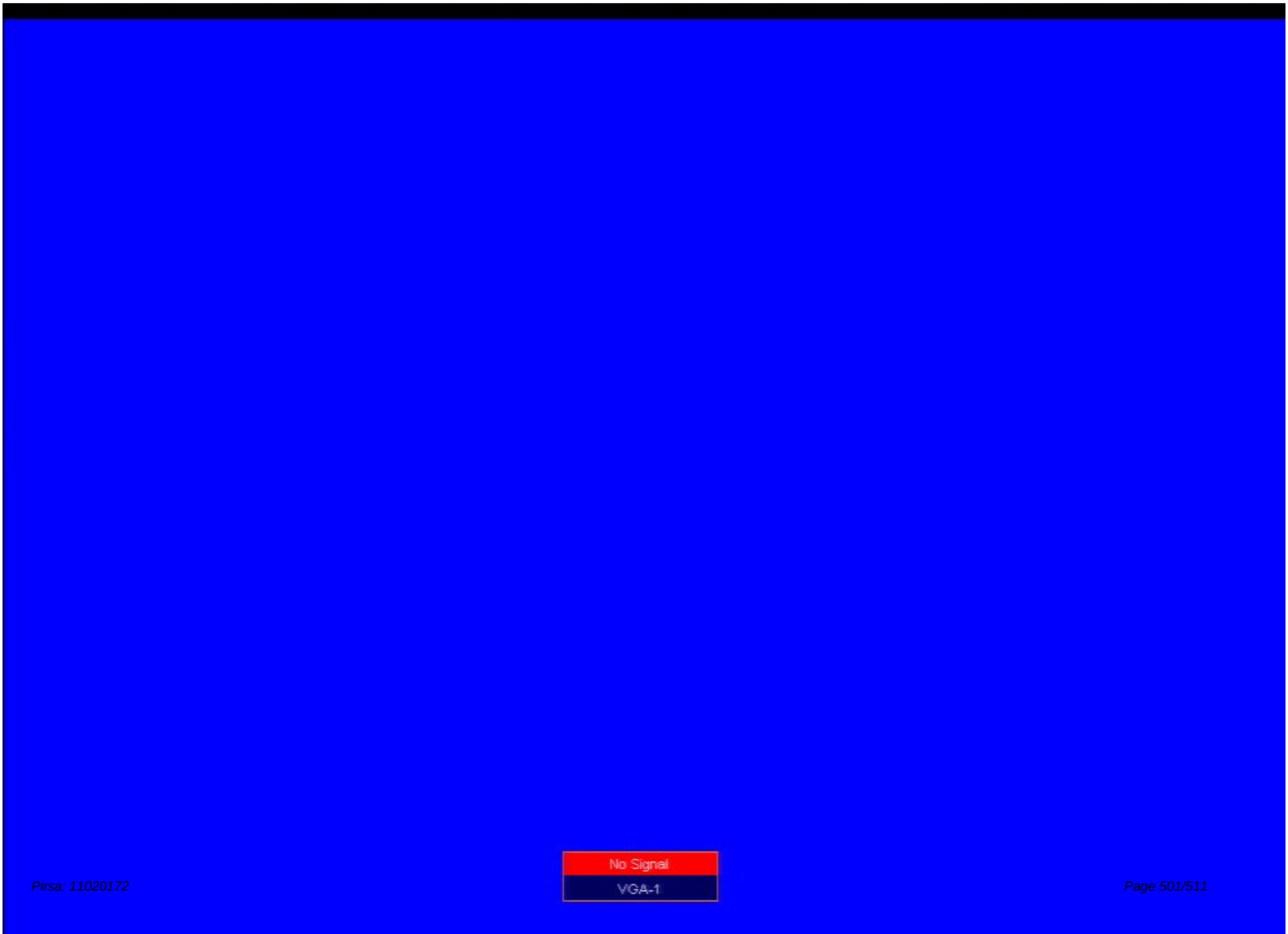
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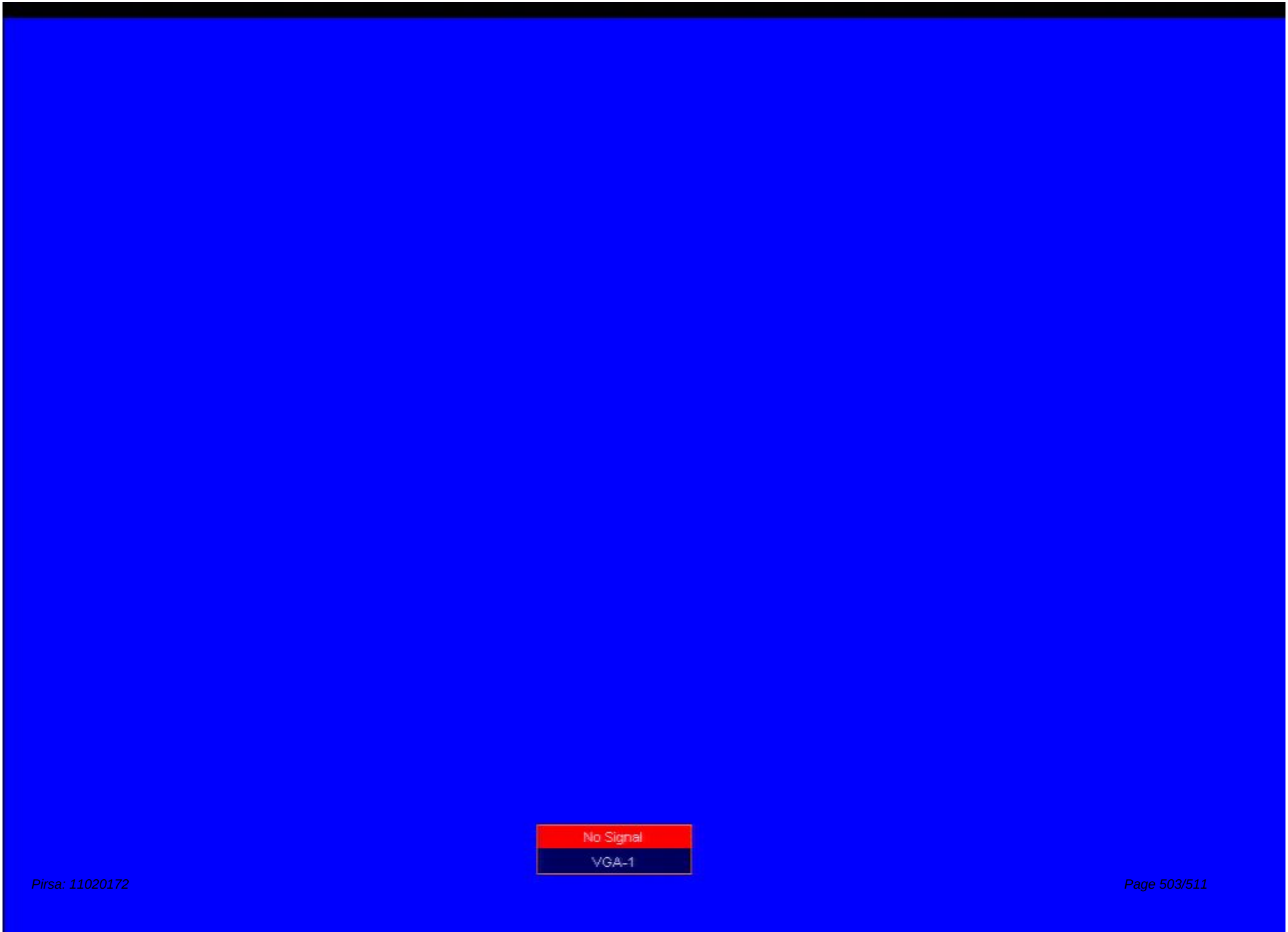
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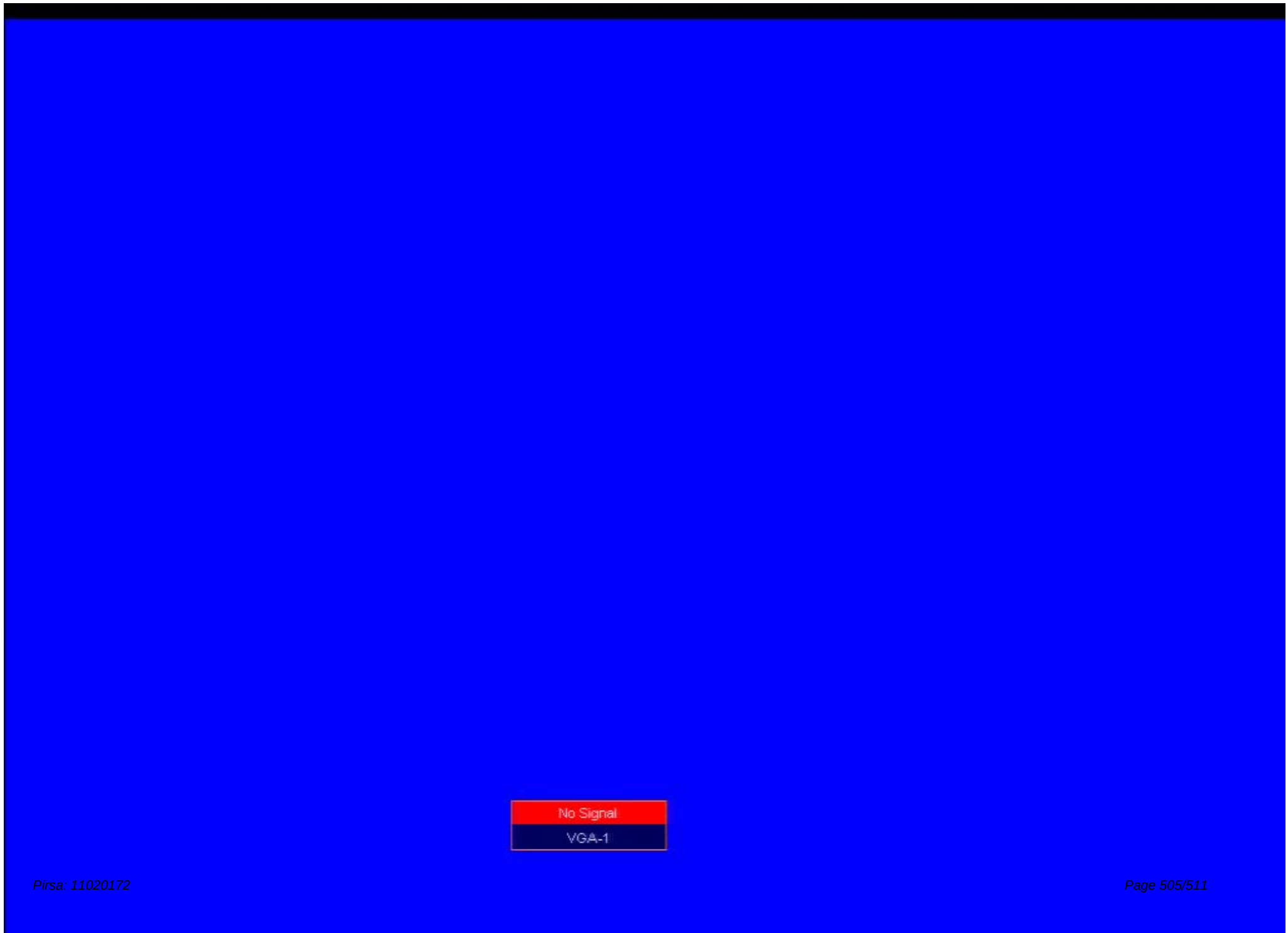
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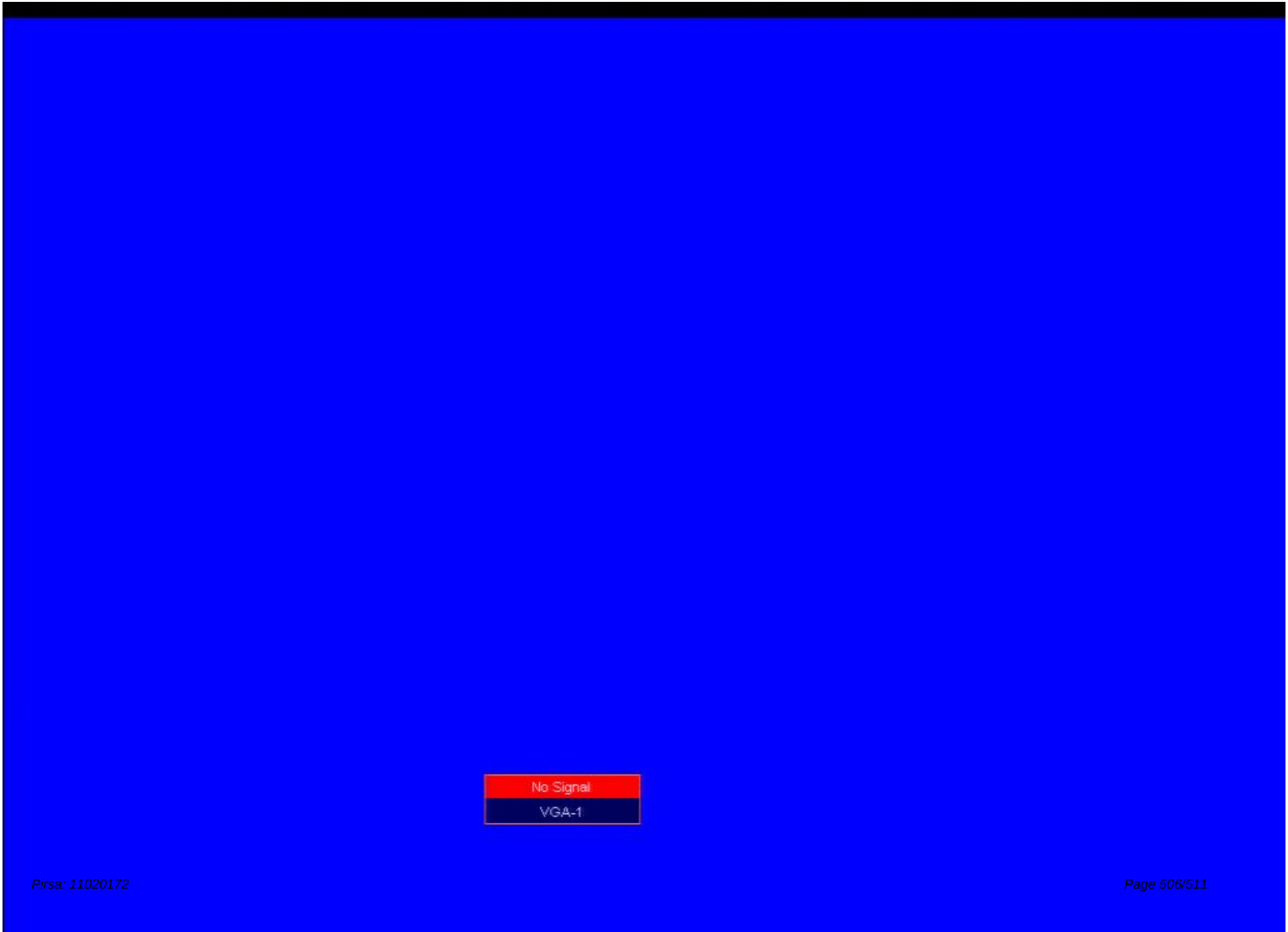
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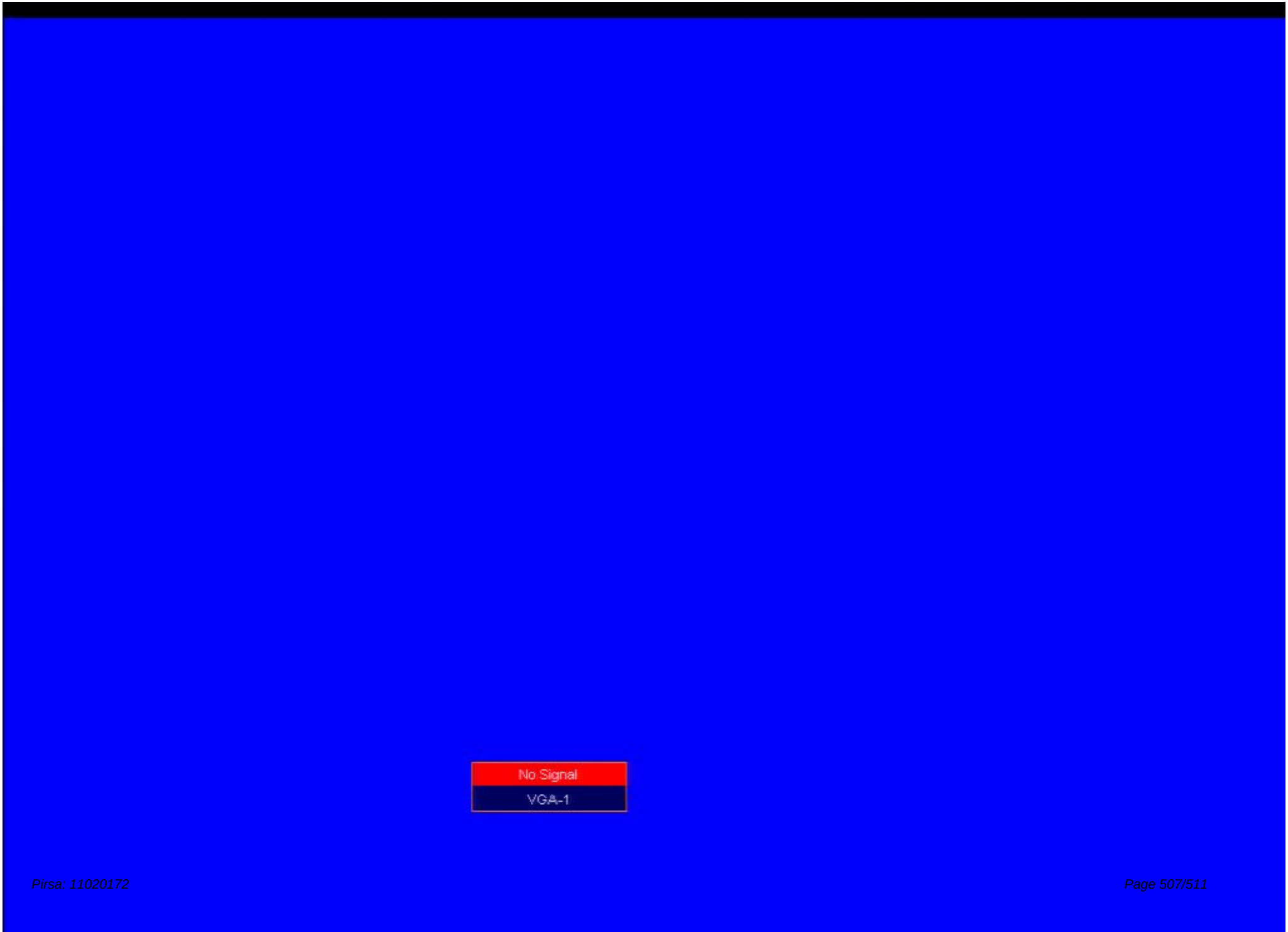
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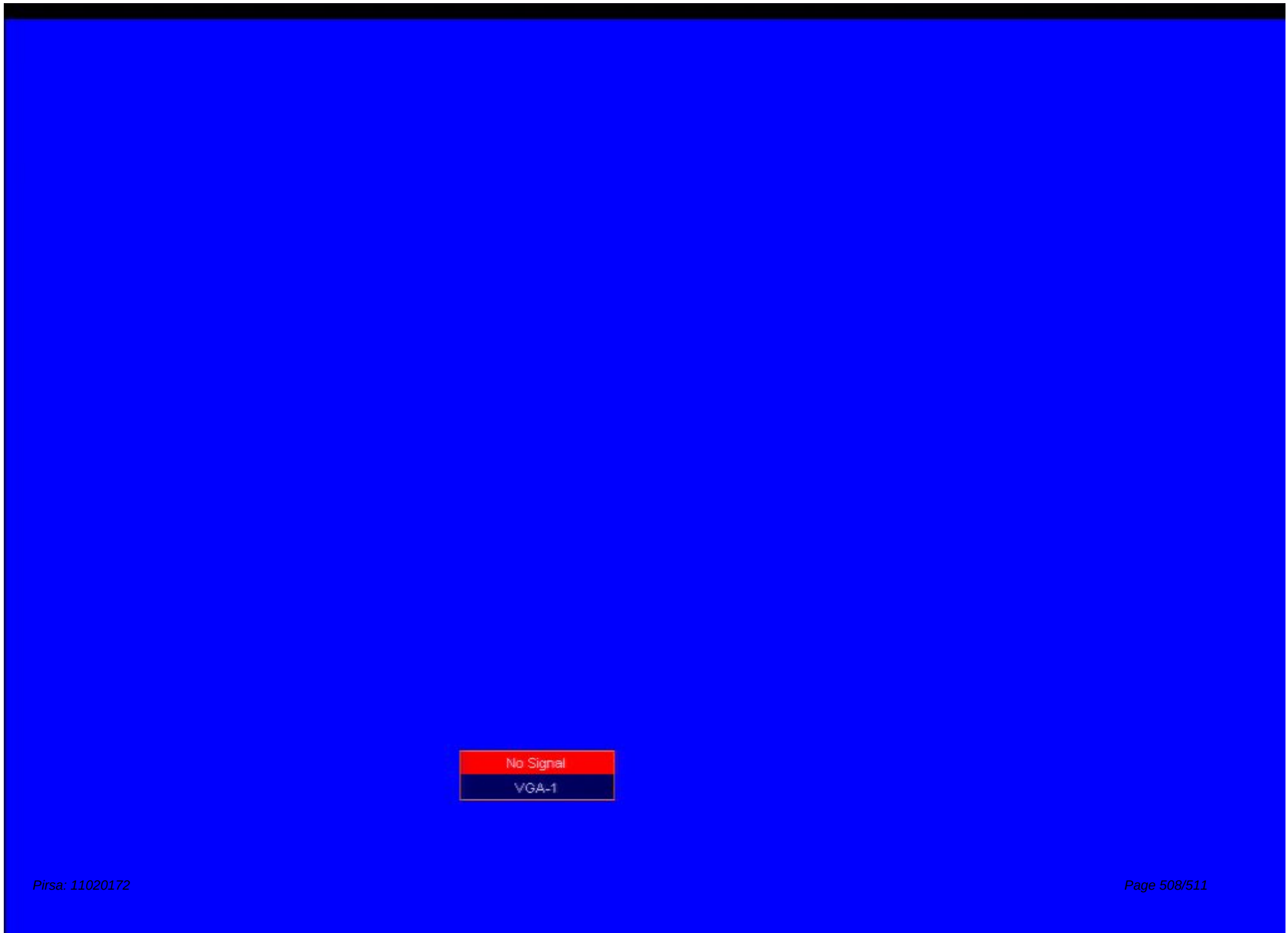
VGA-1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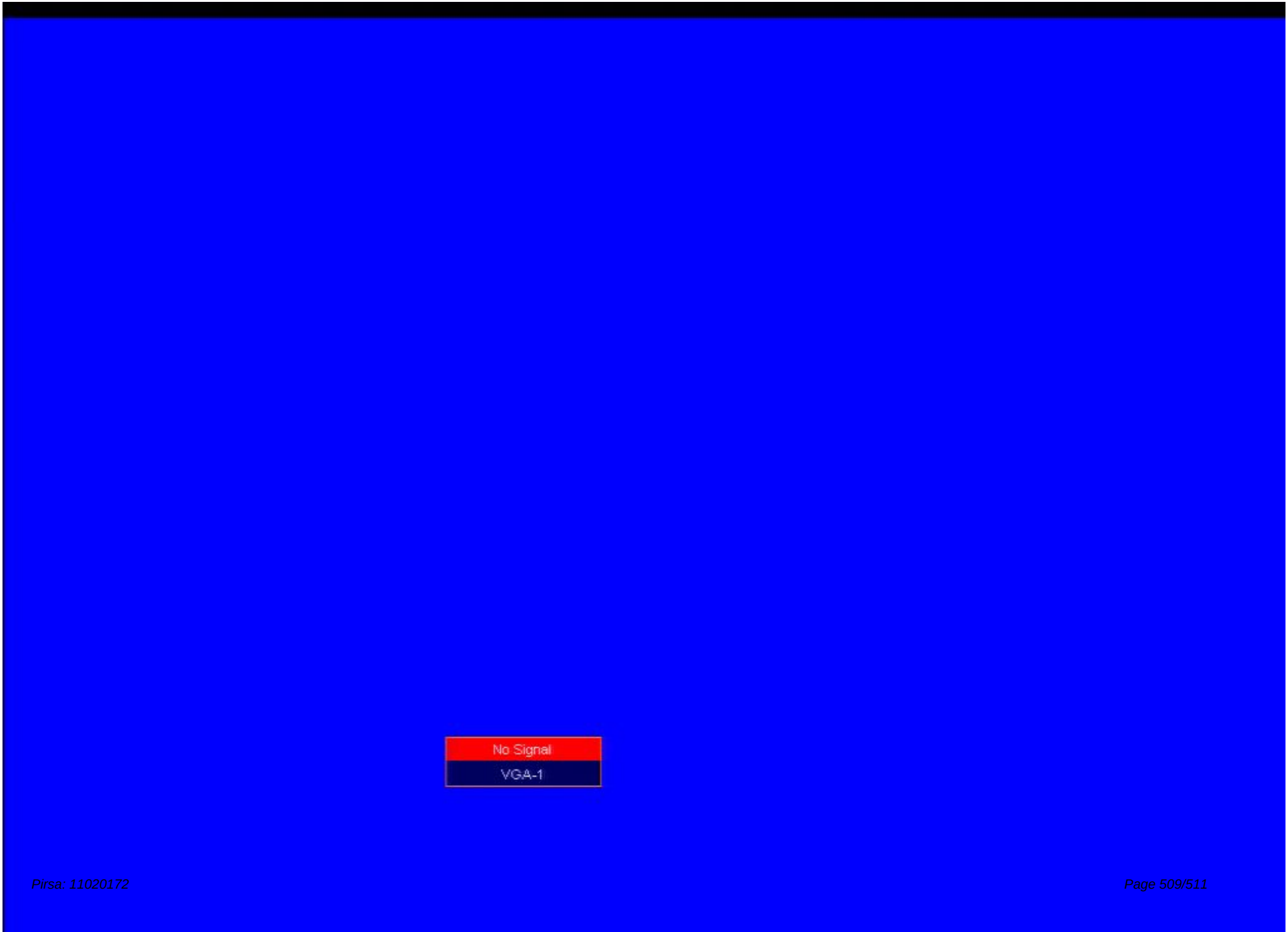
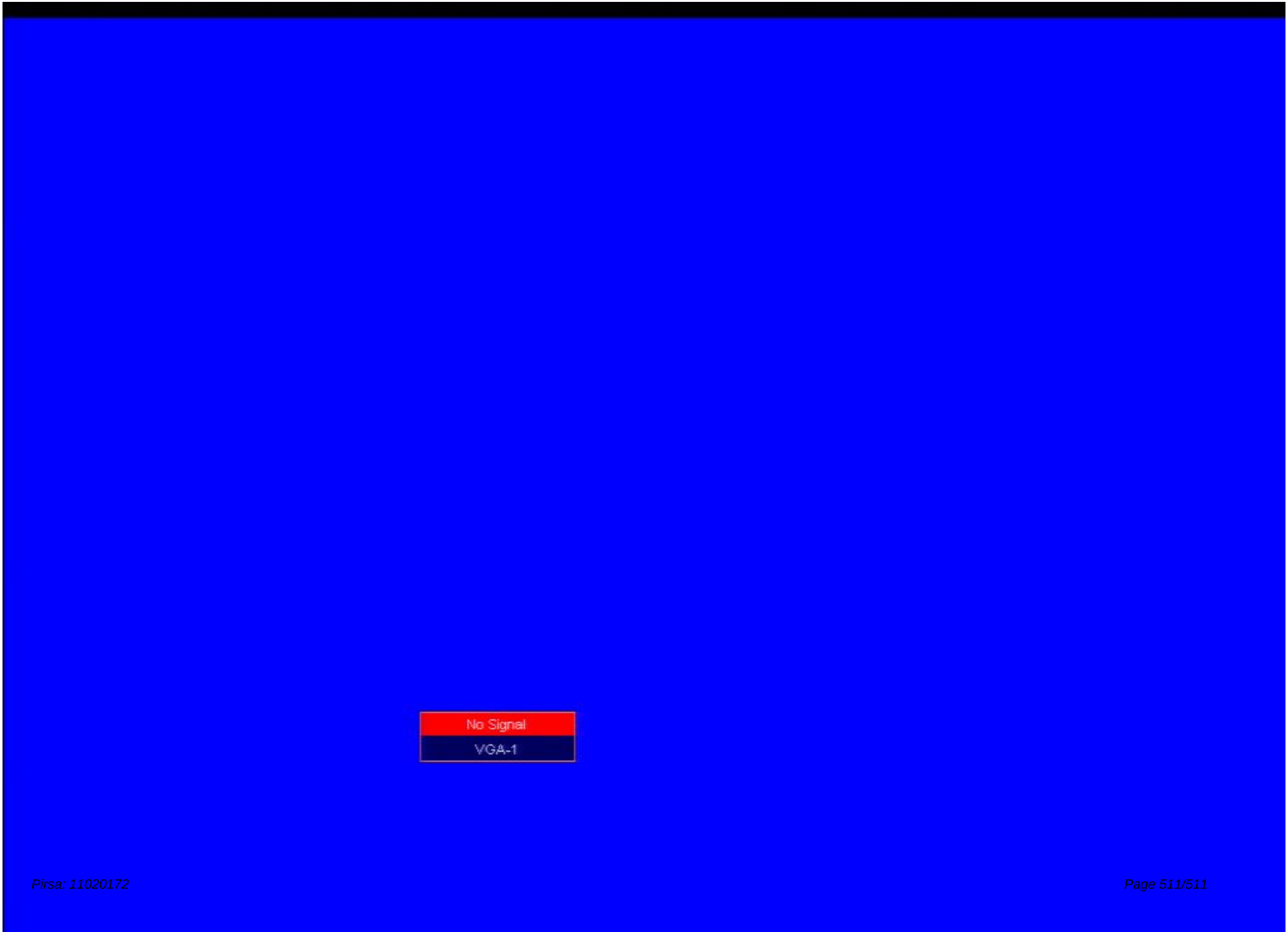

No Signal
VGA-1

No Signal
VGA-1


No Signal
VGA-1