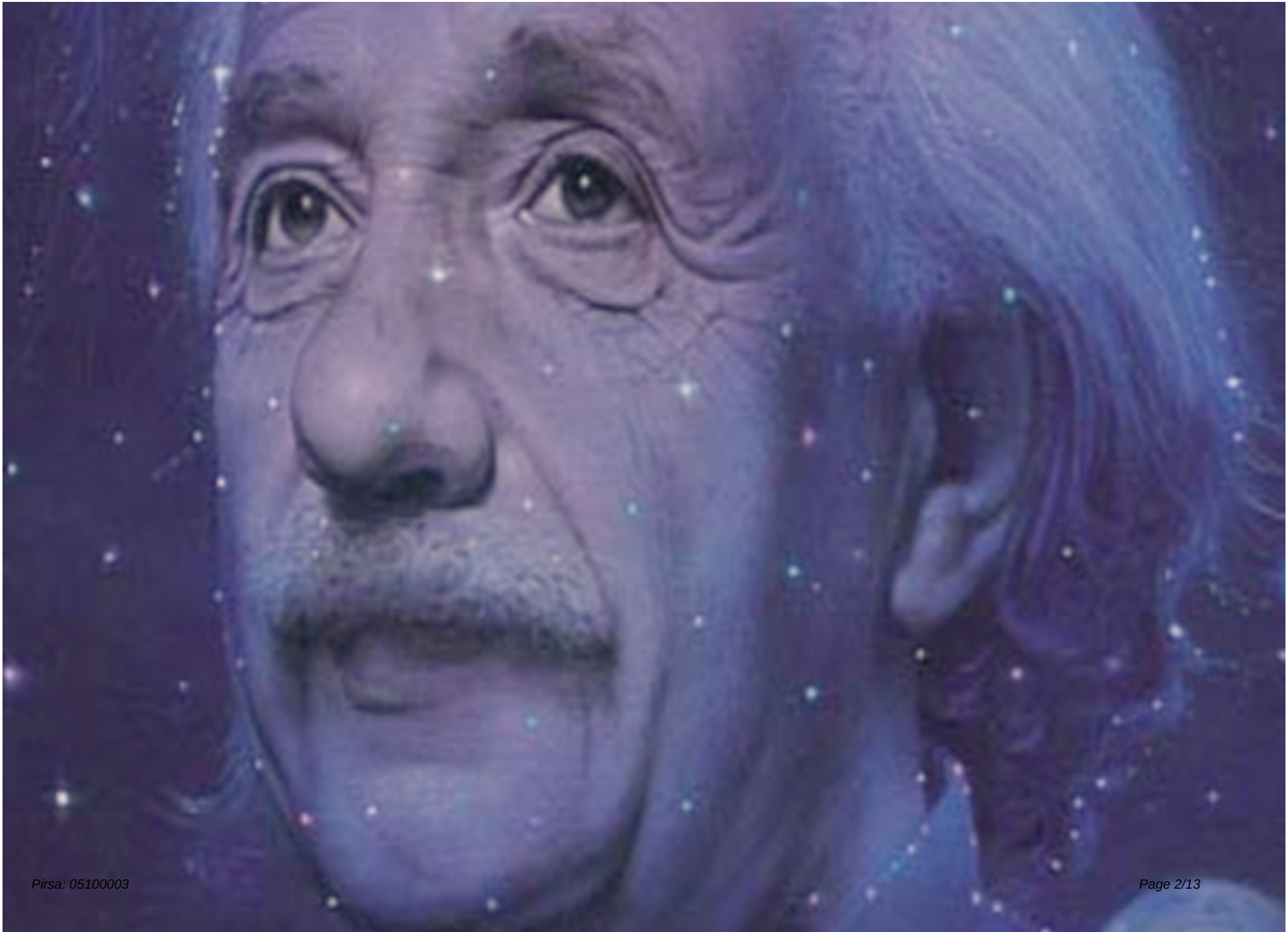
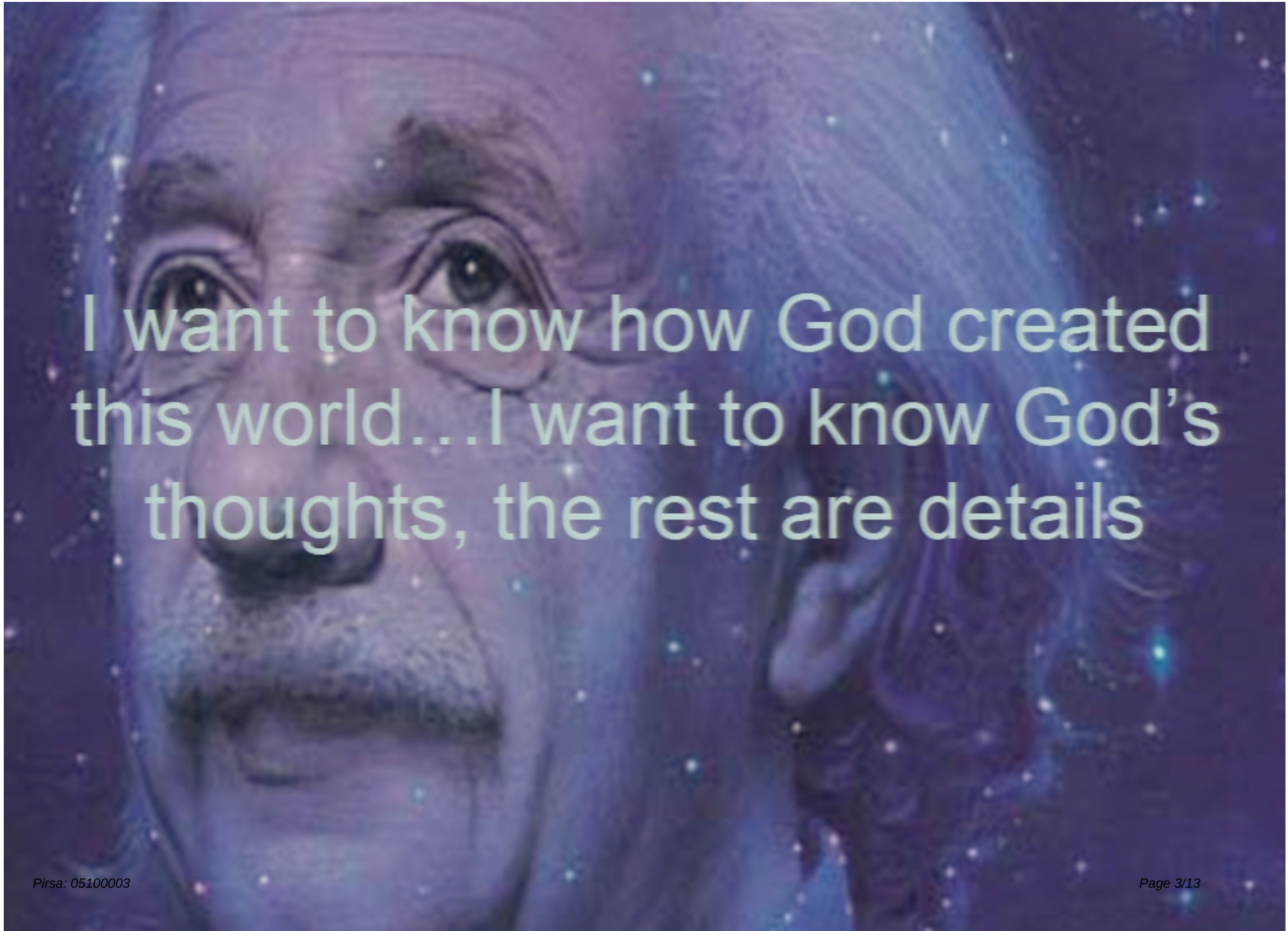
Title: March 1905: Einstein\'s Revolutionary Quantum Paper

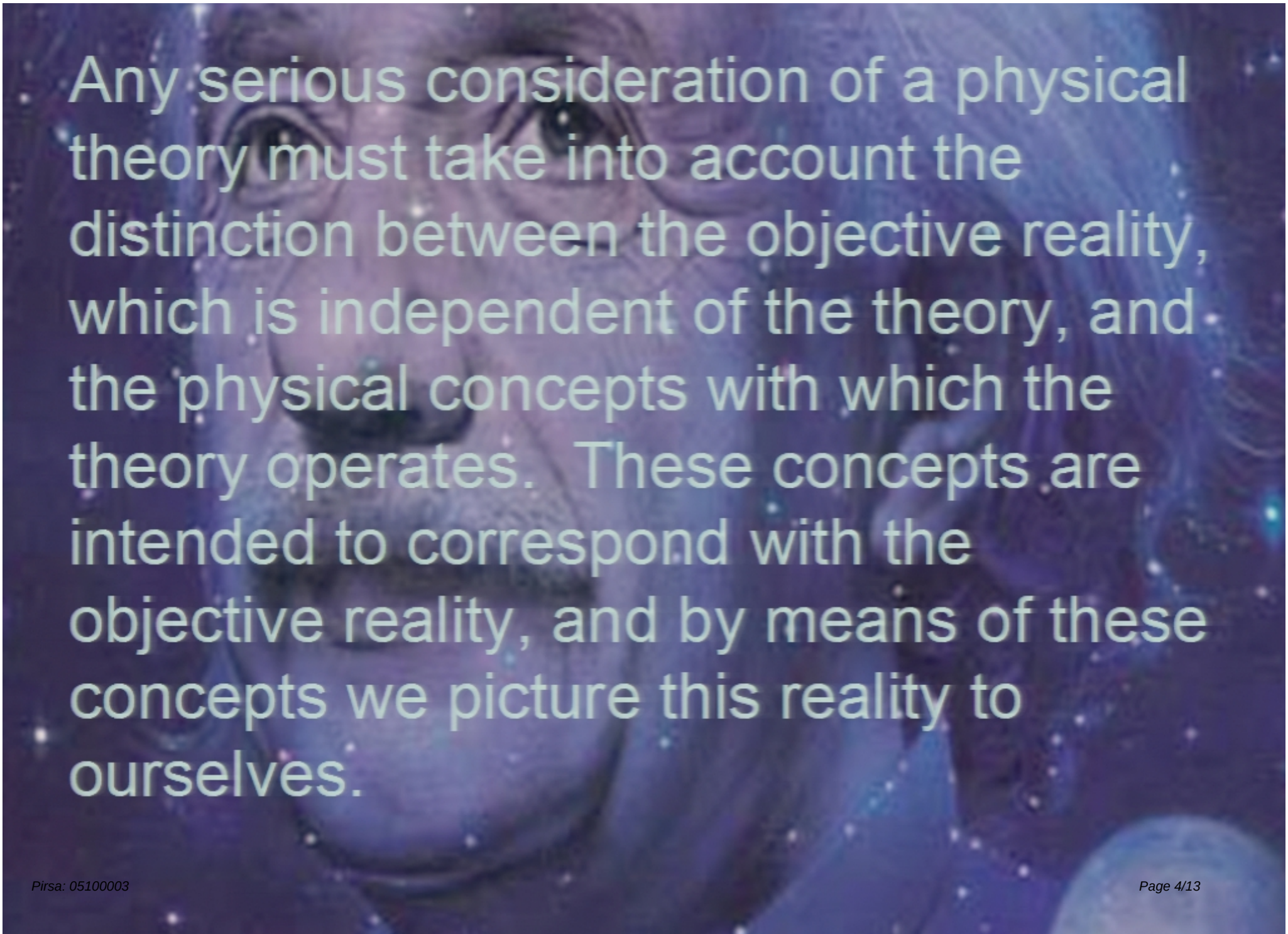
Date: Oct 01, 2005 04:00 PM

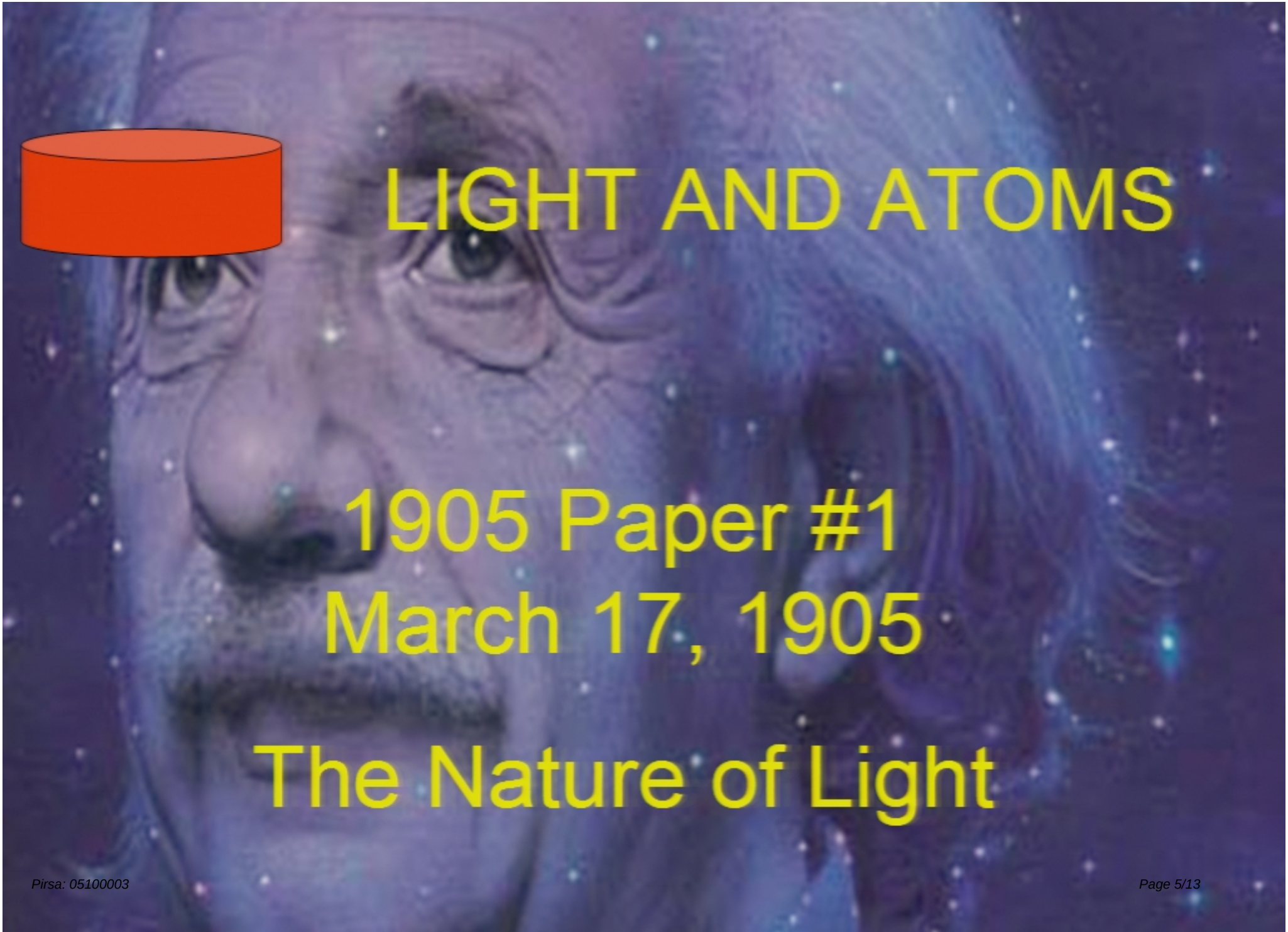
URL: http://pirsa.org/05100003

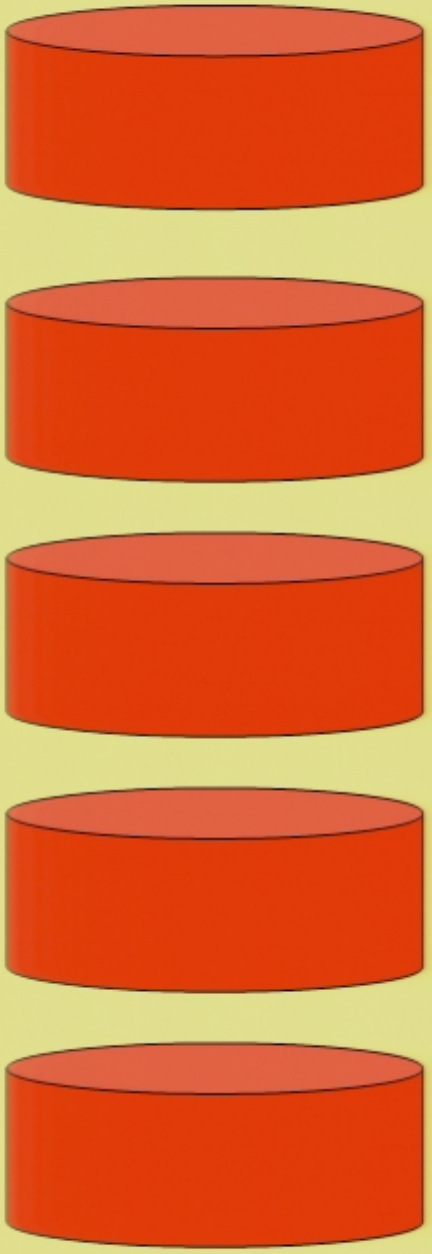
Abstract: EinsteinÂ’s March paper, the only paper that Einstein himself called revolutionary, directly challenged the firm beliefs of all physicists. With compelling evidence in their support, physicists regarded the nature of light as a closed chapter: light was a continuous electromagnetic wave. Einstein countered this entrenched belief with the claim that light was a stream of discontinuous, isolated particles. The age-old conundrum of continuity vs. discontinuity was again called into play. EinsteinÂ’s contemporaries totally rejected his idea and they even apologized for his having Â“gone overboard.Â” In the end, however, EinsteinÂ’s light particle became part of the woodwork of physics. <kw>John S Rigden, Einstein, light, electromagnetic, continuity, discontinuity, atoms, wave lengths, photoelectric effect </kw>




I want to know how God created this world…I want to know God's thoughts, the rest are details


Any serious consideration of a physical theory must take into account the distinction between the objective reality, which is independent of the theory, and the physical concepts with which the theory operates. These concepts are intended to correspond with the objective reality, and by means of these concepts we picture this reality to ourselves.


LIGHT AND ATOMS
1905 Paper #1
March 17, 1905
The Nature of Light



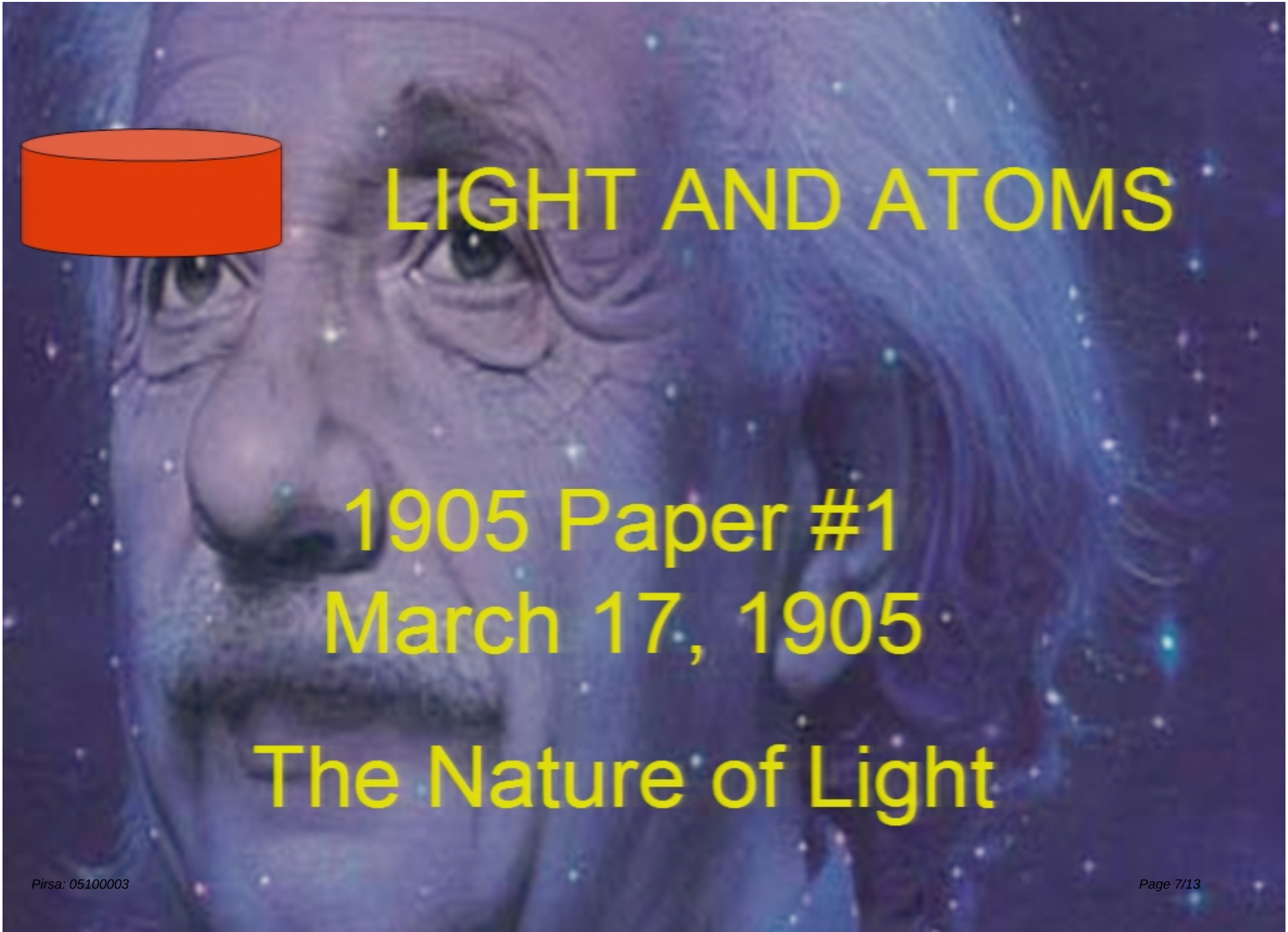
Light and Atoms

Thermodynamics and Kinetic Theory

Mechanics, Thermo. and Kinetic Theory

Light and the Ether

Mechanics and Electromagnetism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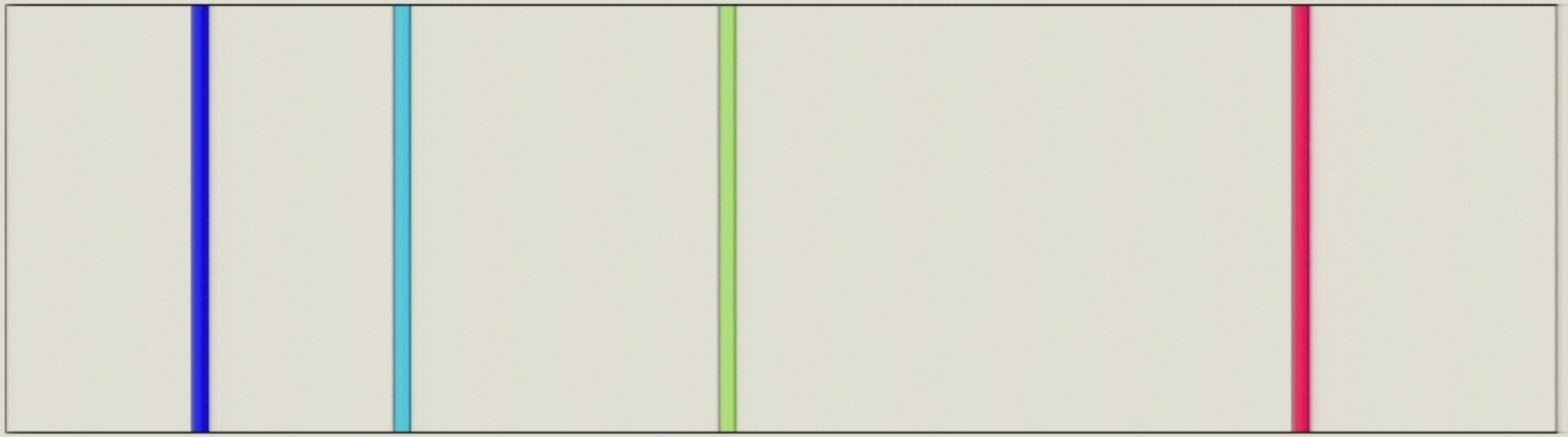
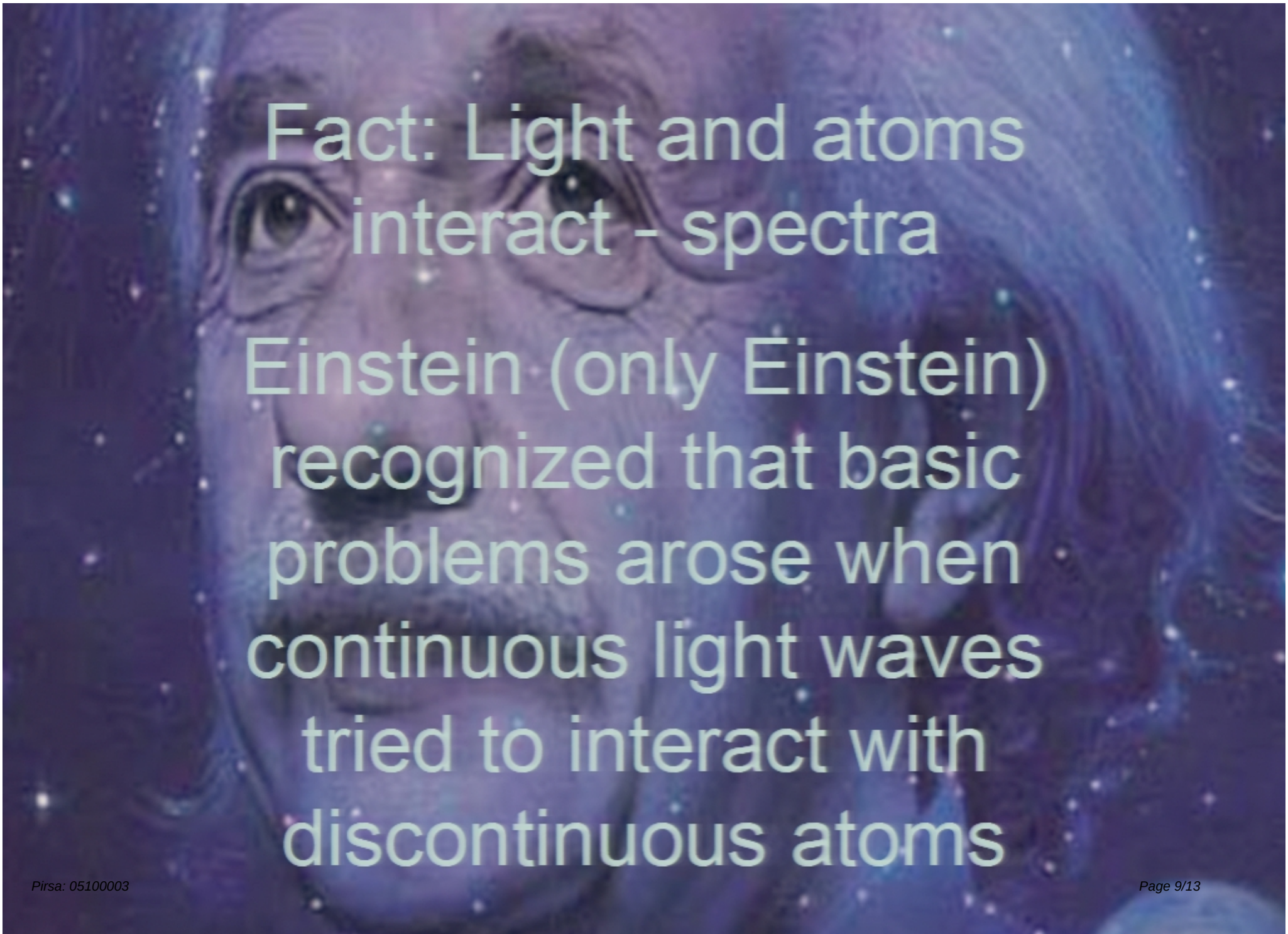
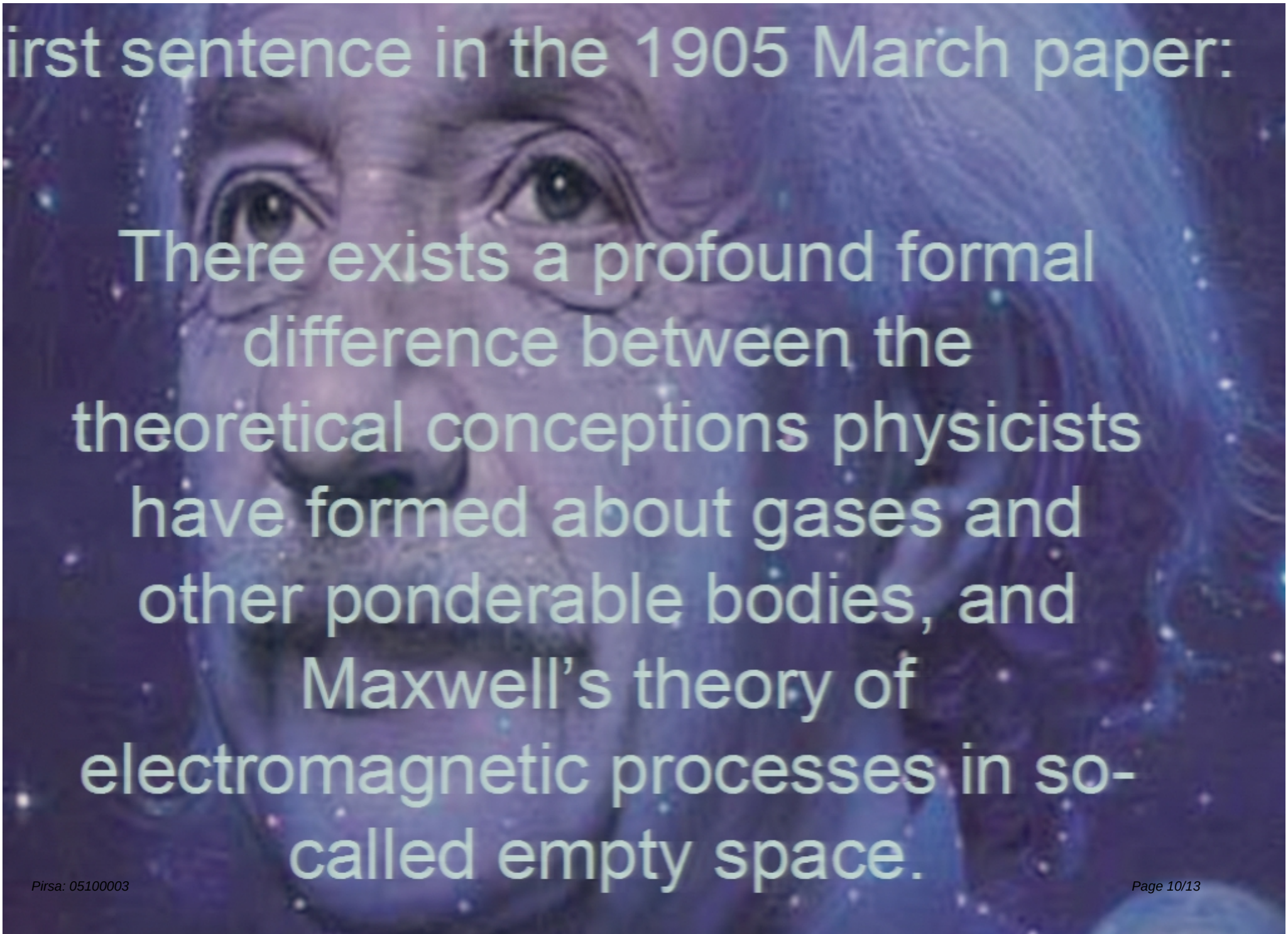
Wavelengths (in Angstroms) of spectral lines

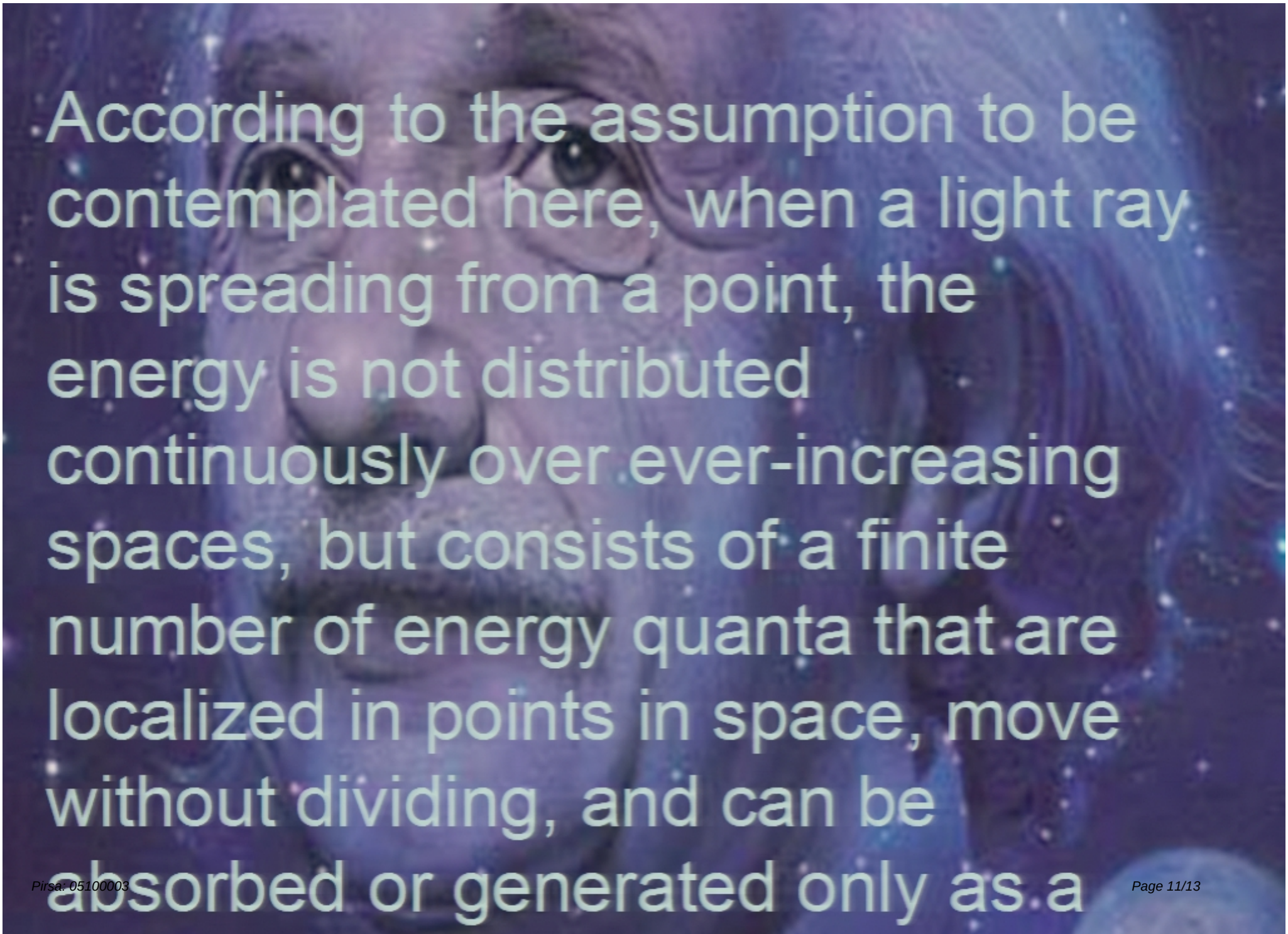


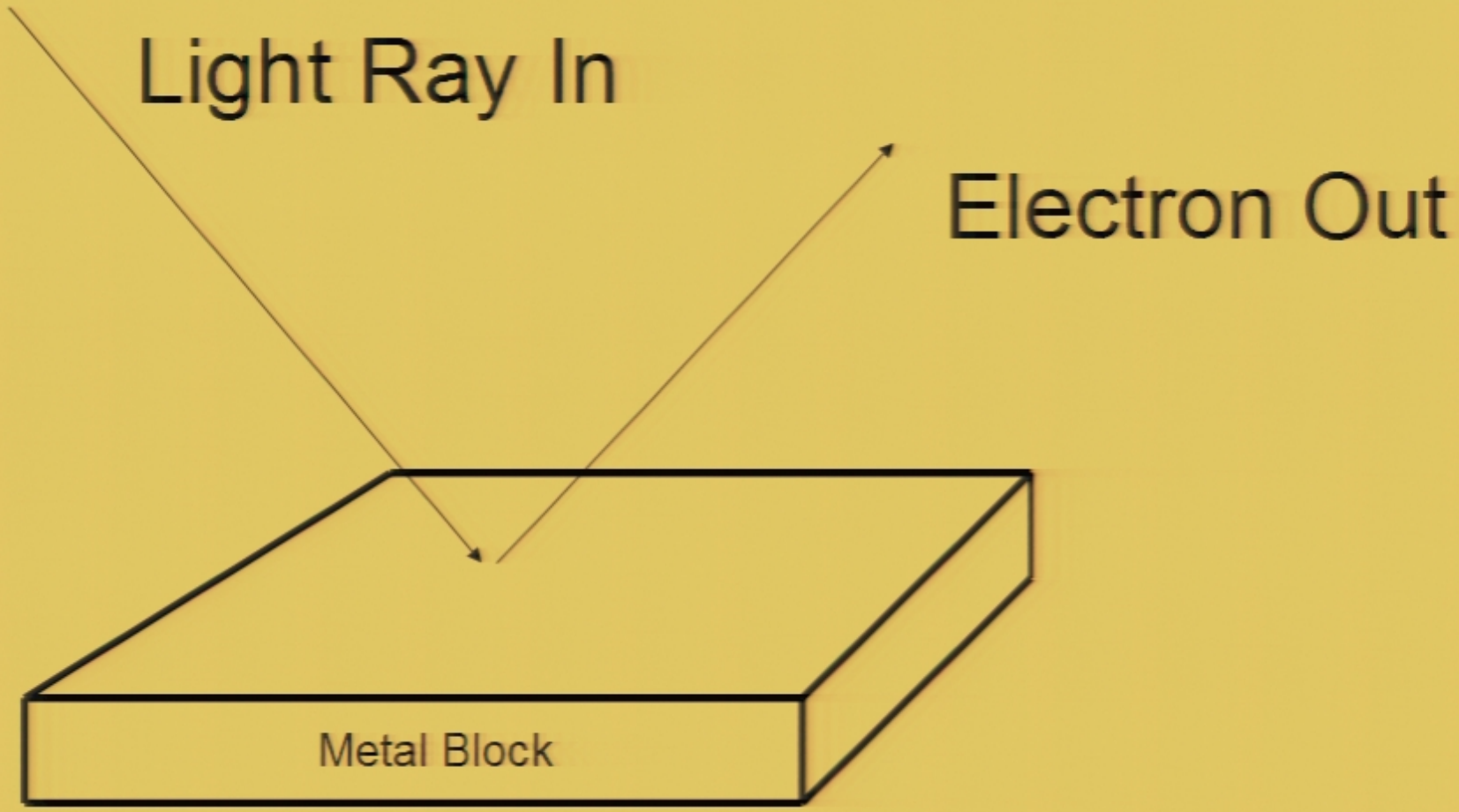
4,101.20 4,340.10 4,860.74 6,562.10

Fact: Light and atoms interact


Fact: Light and atoms interact - spectra
Einstein (only Einstein) recognized that basic problems arose when continuous light waves tried to interact with discontinuous atoms


irst sentence in the 1905 March paper:
There exists a profound formal difference between the theoretical conceptions physicists have formed about gases and other ponderable bodies, and Maxwell's theory of electromagnetic processes in so-called empty space.


According to the assumption to be contemplated here, when a light ray is spreading from a point, the energy is not distributed continuously over ever-increasing spaces, but consists of a finite number of energy quanta that are localized in points in space, move without dividing, and can be absorbed or generated only as a


Light Ray In
Electron Out
Metal Block