Title: Graduate Student Seminar - Prep & Present: First Thoughts and Ideas

Speakers: Bindiya Arora
Date: October 30, 2023 - 2:00 PM

URL: https://pirsa.org/23100118

Abstract: This session will introduce the grad student seminar series, include an interactive session focusing on thoughts and ideas for effective preparation and presentation, and will gauge students' interest about upcoming science outreach activities.

Zoom link https://pitp.zoom.us/j/95397824623?pwd=LzViSVBpTXJzcjZXbjlhdzZKMk9Ndz09

Getting started

Share your ideas of information you will keep in mind before starting to prepare

Plan: Look at the Big Picture

- Know your audience
- Define the goals, topic and appropriate depth and scope of information.
- Plan your talk, make a script
- Plan your PowerPoint ,smooth transition between slides, frame a story
- Presentation length

Common Design tips

Share some useful common tips which you think might be in general applicable while prepare a ppt

Common tips

- Use the Master Slide to define your slide
- Where possible, include a heading for each slide
- Use a plain background and remove any unnecessary detail
- Monochromatic color scheme (unified)
- Box/highlight important fact

Common tips

- Embrace empty space
- Use vertical and horizontal guide markers to align elements
- Avoid too many colours, clutter or fancy visual effects
- Add sources whenever possible
- Use graphics & visual aid
- Use one idea per slide

Text

Share tips for the text on the slides

Common tips

- Use bulleted points and avoid long sentences
- Font size: 30 - 48 point for titles, 24 - 28 for text
- Avoid all capital letters
- Proofread carefully for spelling and grammar
- Use high contrast to ensure visibility
- Sans-serif fonts (Helvetica, Tahoma, Verdana)
- Stick to one font, or two at the most

Figures and images

Share tips for the figures and images on the slides

Common tips

- Use high quality graphics
- Ensure images are clear and relevant
- Label all figures and tables
- Put units beside numbers on graphs and charts
- Remove background

Delivery

Share tips for delivering a talk effectively

Common tips

- Don’t Just Read
- Speeches are about Stories
- Eye Contact
- Word Summary
- Add pauses for emphasis

Common tips

- Project your voice
- Don’t plan gestures
- Don’t Apologize
- Do Apologize if You’re Wrong
- Practice!

Body language

Share body language tips

Common tips

- Open your chest and arms
- Back straight
- Maintain eye contact
- Walk around
- For important points point or look directly
- Smile

Press esc to exit full screen

The Art of Keeping Your Audience Awake

Dr Bindiya Arora
PSI Fellow
Perimeter Institute for Theoretical Physics, Canada

PERIMETER INSTITUTE

Click Here

Example

HEADLINE

Most Western languages read left to right, top to bottom. Knowing this natural reading order, you can direct people's eyes in a deliberate way to certain key parts of a slide that you want to emphasize. Using layout is a simple but effective w ay to control the flow and hierarchy of information.

Example

HEADLINE

Most Western languages read left to right, top to bottom. Knowing this natural reading order, you can direct people's eyes in a deliberate way to certain key parts of a slide that you want to emphasize. Using layout is a simple but effective w ay to control the flow and hierarchy of information.

Example

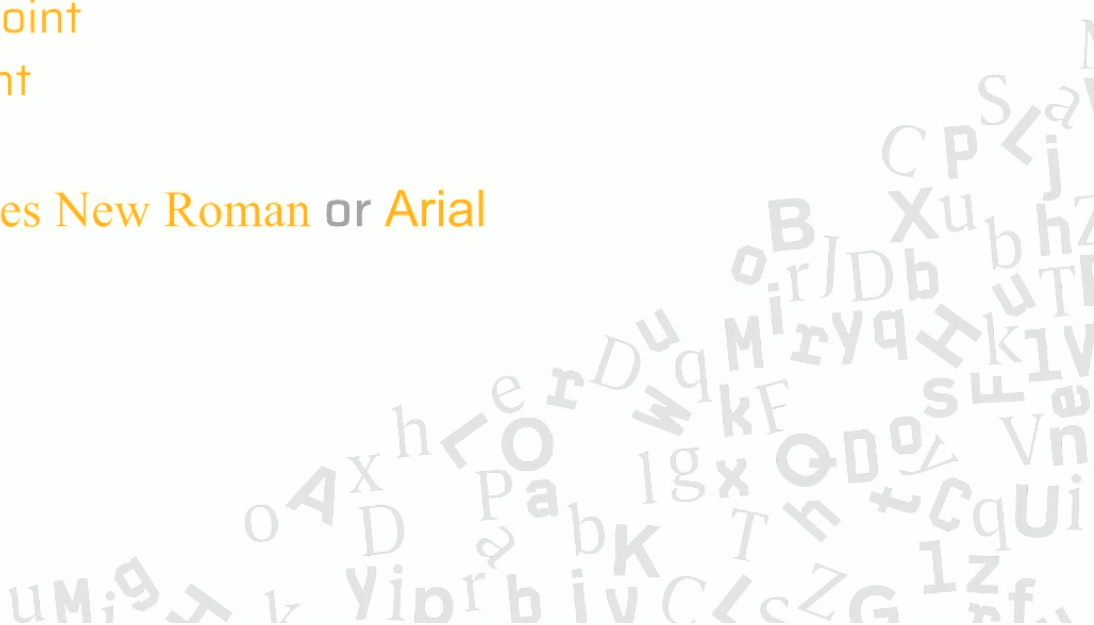
HEADLINE

- Bullet Point
- Bullet Point
- Bullet Point
- Bullet Point
- Bullet Point

Fonts

- Use different size fonts for main points and secondary points
  - this font is 18-point
  - the main point font is 22-point
  - and the title font is 36-point

- Use a standard font like Times New Roman or Arial

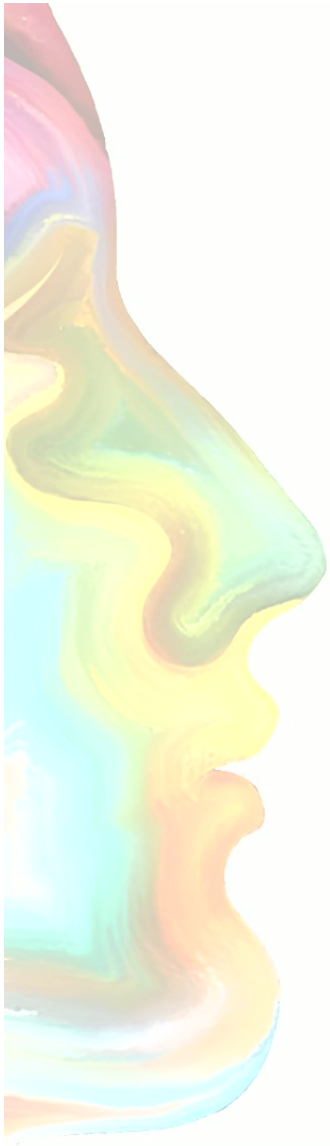


Fonts

- If you use a small font - your audience won't be able to read what you have written
- CAPITALIZE ONLY WHEN NECESSARY - It is difficult to read
- Don't use a complicated font

COLORS

- Using colour for decoration is distracting and annoying
- Using a font colour that does not contrast with the background colour is hard to read
- Using a different colour for each point is unnecessary
  - Using a different colour for secondary points is also unnecessary
- Trying to be creative can also be bad



Colo

- Use a color of font that contrasts sharply with the background
- Ex: **Blue font on white background**
- Use color to **emphasize a point -** But only use this occasionally

Example

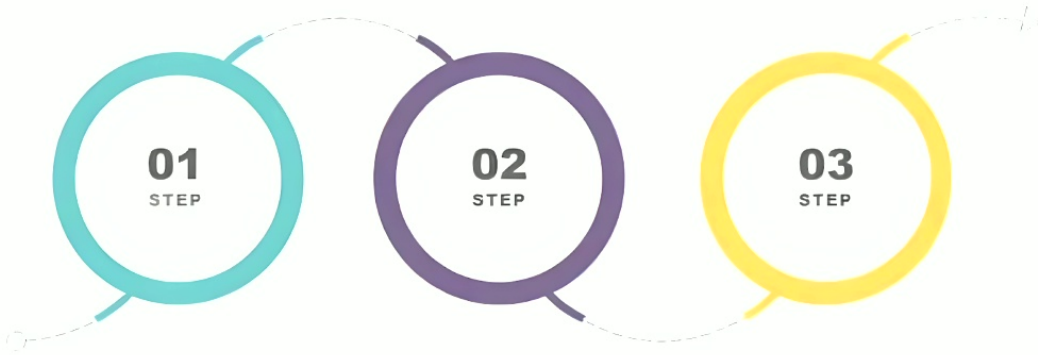
Example

This is easy to read

No matter what color you choose

Presentation is about telling a story

A story has a beginning, middle and an end



Start

Introduction
Motivation
Outline

Body

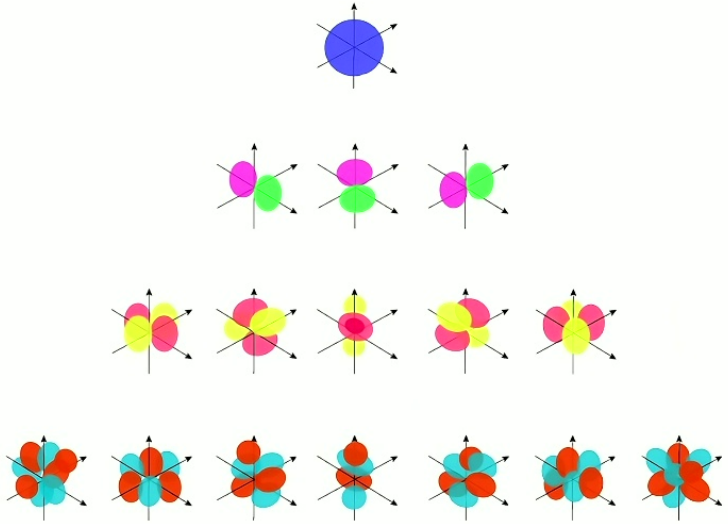
Examples

End

Conclusion
Future Work
Questions

Example

Design and underlying concepts of atomic community codes for high-precision atomic structure calculations



Bindiya Arora
Perimeter Institute for Theoretical Physics, Canada
University of Waterloo, Canada
Guru Nanak Dev University, India

Open with a hook

Several standard/non standard approaches

Captivating Visual

Common Misconception

Surprising Fact/Statistics

Relevant Joke

Example

“If you think presentations cannot enchant people, then you have never seen a really good one”

~ Guy Kawaski

Example

Arrow of Time

Why we see time flowing in one direction ?

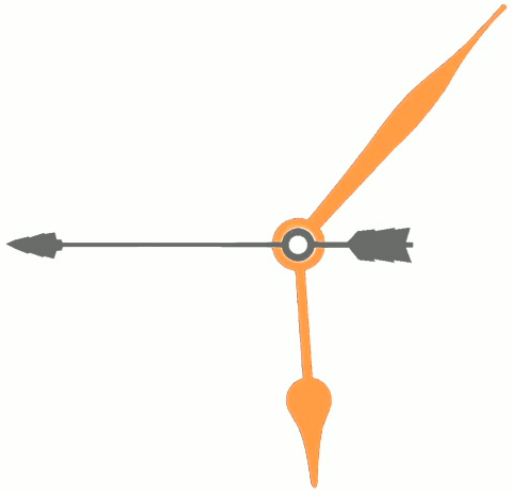


Image Source : Wired, Time Might Only Exist in Your Head. And Everyone Else's, https://www.wired.com/2016/09/arrow-of-time/

Example

Why Coulomb potential is 1/r ?

Why are all electron same ?

Why same charges repel ?

Example

2 Second chapter

Arrow of Time

- Schrodinger vs Heisenberg
- Quantum Revivals
- Bloch Sphere

3 Third chapter

Time Dependent Potentials

- Interaction Picture
- Fermi Golden Rule
- Rabi Oscillations

4 Fourth chapter

Working With Ensembles

- Density Matrix
- Measurement & Decoherence
- Composite Systems

5 Fifth chapter

Which Way? Why This Way?

- Path Integral Formalism
- Classical vs Quantum
- How to Interpret

6 Sixth chapter

From Particles to Fields

- Field (Scalar)
- Bunch of Oscillators
- Propagating Disturbances

7 Seventh chapter

From Fields to Particles

- Birth of Particles
- Yukawa's Hypothesis
- Perturbative Field Theory

Example

Extraordinary Progress the Control of Atoms and Ions

Atoms are now:

Ultracold

300K

1997 Nobel Prize
Laser cooling
Laser trapping

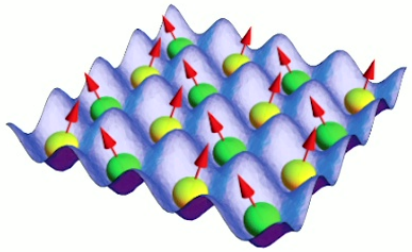
2001 Nobel Prize
Bose-Einstein
Condensation

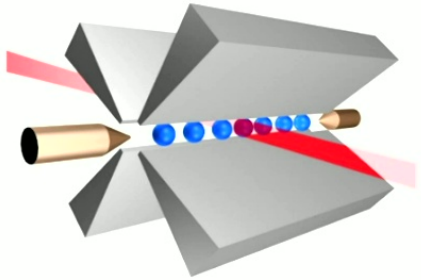
2005 Nobel Prize
Frequency combs

2012 Nobel prize
Quantum control

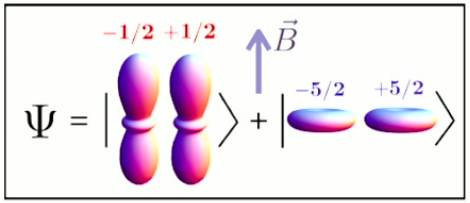
pK

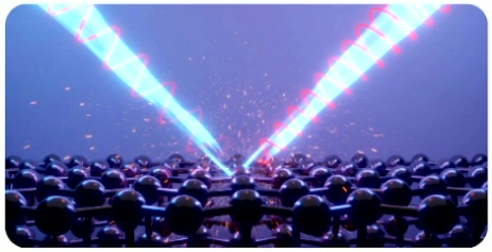
Trapped





Precisely Controlled



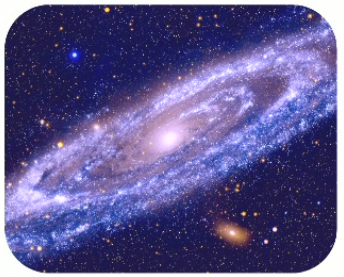


Example

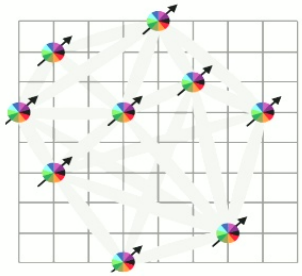
Applications that need precise atomic data

Atomic clocks

Plasma physics



Astrophysics



Ultracold atoms:
Quantum computing and Simulation

Particle physics:
Searches for dark matter and other "new" physics

Example

Observations

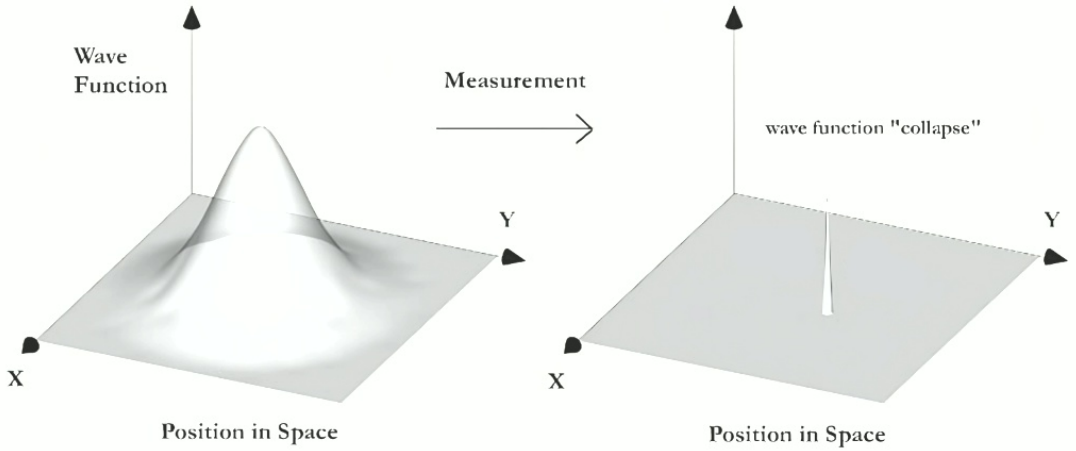
Particles hit screen at Random Positions = No pattern in trajectory

However we find pattern in the Probabilities

Example

The Copenhagen interpretation

Born, Heisenberg, Bohr



It requires a process called **wave function collapse**
for which there is no known physical explanation

Image Source : www.afriedman.org

Example

Interaction With Environment

Why excited states of atoms have finite lifetime
even though they are eigen states

$|\psi\rangle_s$ Not the complete description of the system

$|\psi\rangle_s \otimes |E\rangle$ System interact with environment and dissipates to give time a direction

Example

Lo and behold,

As the cosmic curtains part,

We witness to the grand emergence

of what experimentalists have called the

Example

Interpretations

The act of measurement can affect a particle's behavior, and this influence can manifest retroactively

Realist

- The particle was there
- The uncertainty reflects our ignorance, some additional information (hidden variable) is needed

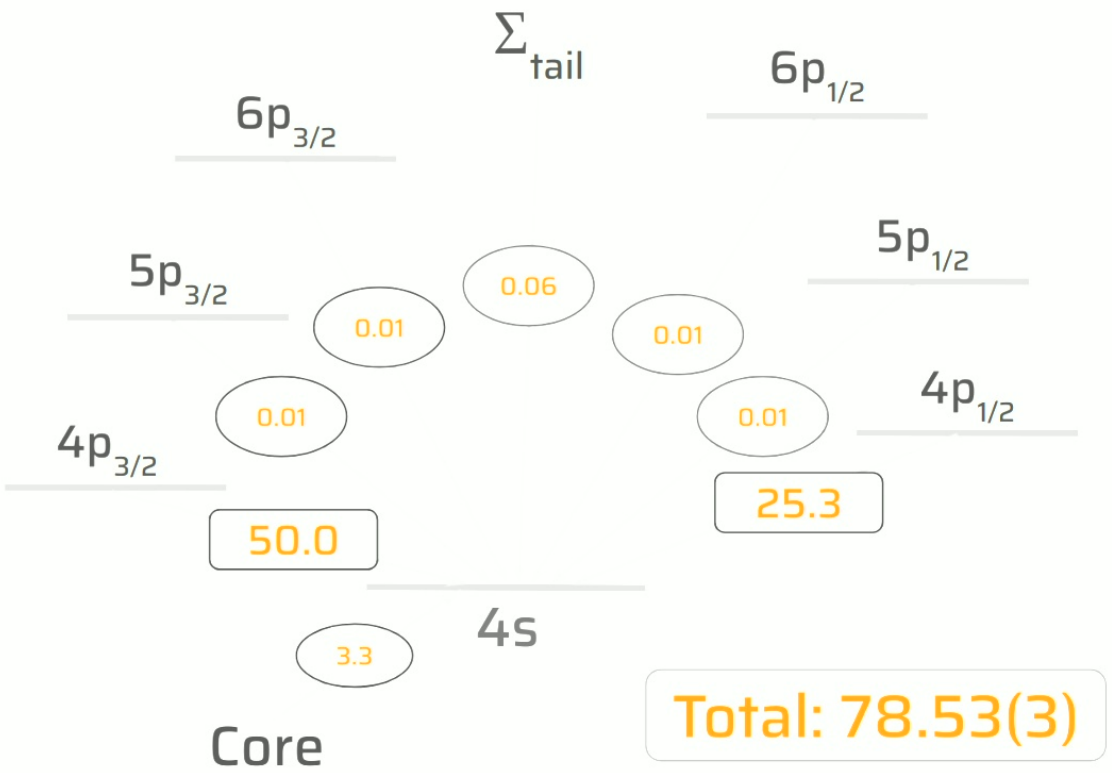
Orthodox

- The particle wasn't really anywhere
- The act of observation not only affects the measured quantity, but it actively brings it into existence (copenhagen interpretations)

Example

Tables are not boring

$^{43}Ca^{+}$ (ω = 0)



Presenting Data

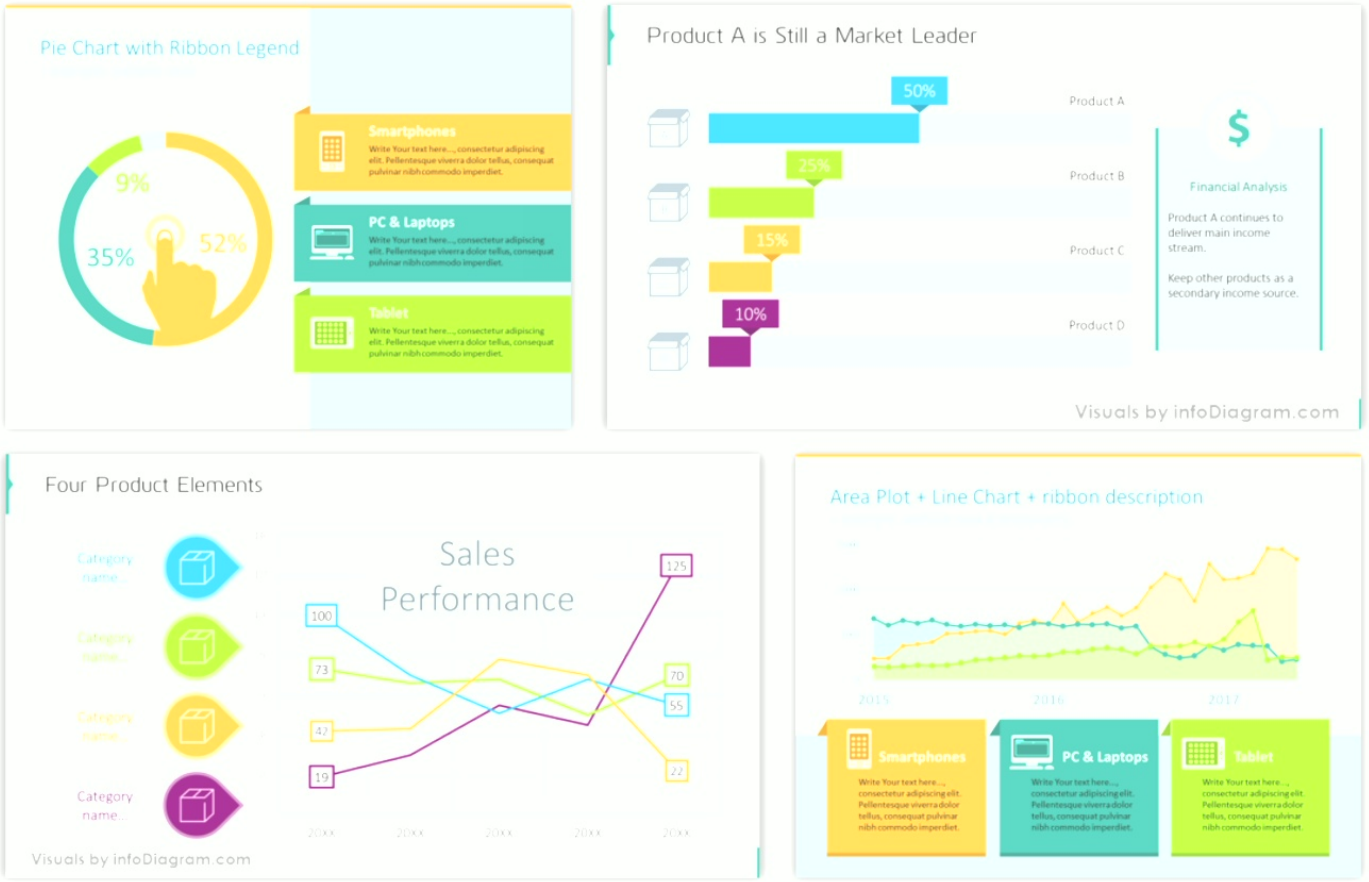


Image Source : blog.infodiagram.com/2017/08/data-chart-example-powerpoint-redesign

A Do-It-Yourself
QUANTUM ERASER

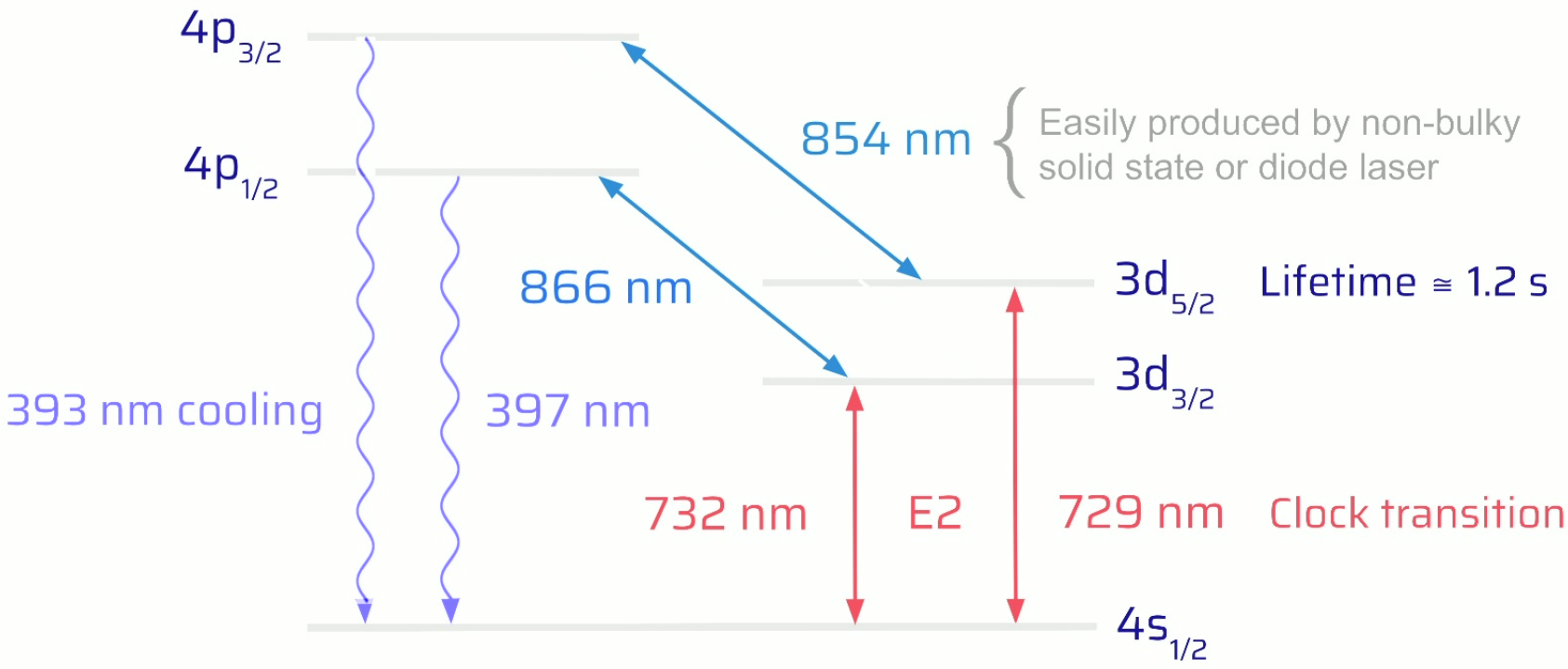
Sources

Hillmer R, Kwiat P. A do-it-yourself quantum eraser. Sci Am. 2007 May;296(5):90-5. Doi: 10.1038/scientificamerican0507-90. PMID: 17500419

Example

Ca^+

Clock transition - $3d_{5/2} \rightarrow 4S_{1/2}$

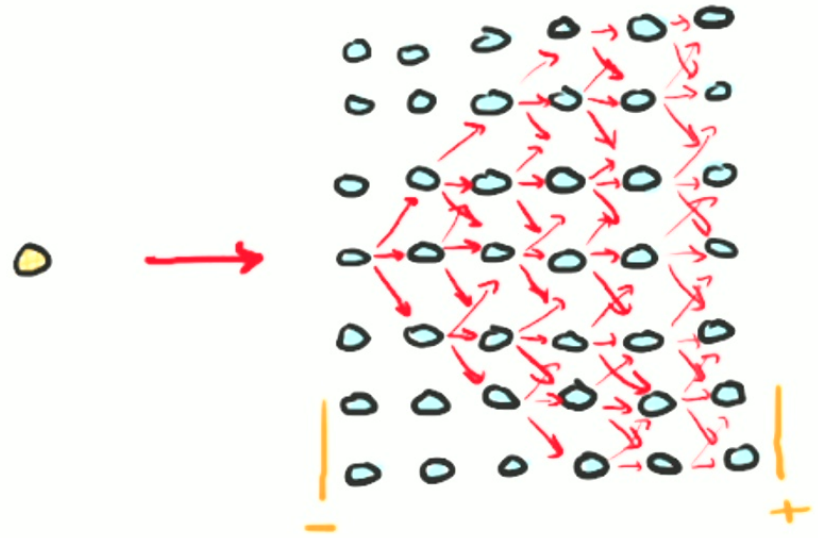


Example

Measurement

"Irreversible magnification"

~Niels Bohr

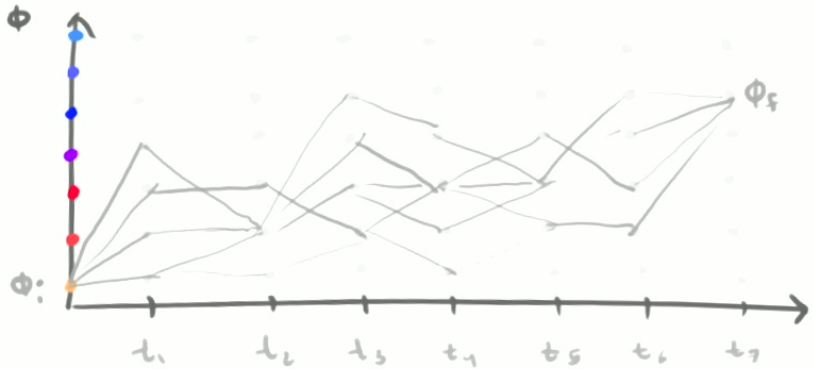


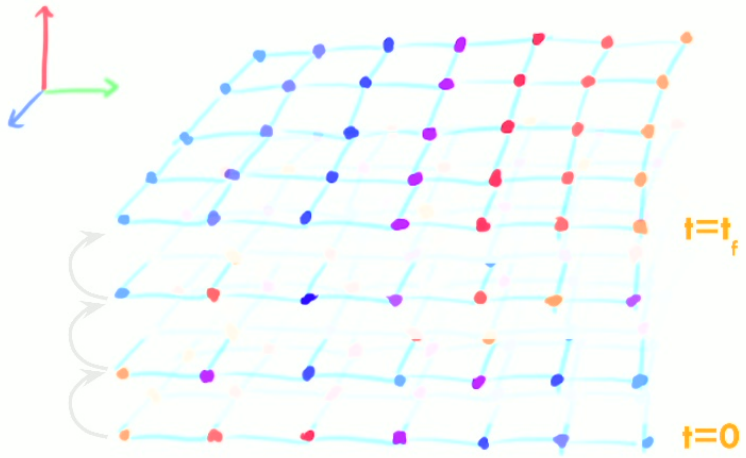
A measurement increases entropy and disorder, energy flows from high to low concentration, and process **can't be reversed**

Example

What Infinite Paths Mean ?

For field it takes all possible configuration between initial to final configuration





Value of ϕ at one point of space takes all possible values from initial state ϕ_i to final state ϕ_f

All Possible Configuration of Field

Example

Different Interpretations

Schrödinger's Representation

$$\langle \psi_S(t)| \hat{A}_S |\psi_S(t)\rangle = \underbrace{\langle \psi_S(t)|}_{\langle \psi_S(t_0)|} \underbrace{\hat{U}^\dagger(t,t_0)}_{\hat{A}_H(t)} \underbrace{\hat{A}_S}_{\hat{A}_H(t)} \underbrace{\hat{U}(t,t_0)}_{\hat{A}_H(t)} \underbrace{|\psi_S(t)\rangle}_{|\psi_S(t_0)\rangle}$$

$$= \langle \psi_S(t_0)| \hat{A}_H(t) |\psi_S(t_0)\rangle$$

Heisenberg's Representation

Example

QFT Path Integral

Path integral in QFT is a fairly complicated object

$$Z = \int D\phi e^{i\int d^d x\left((\partial\phi)^2 - F(\phi)\right)}$$

Example

QFT Path Integral

Path integral in QFT is a fairly complicated object

Integration over Infinite Space-Time

With d=D+1 Dimensions of Space-Time

Transition Amplitude from ground to ground state

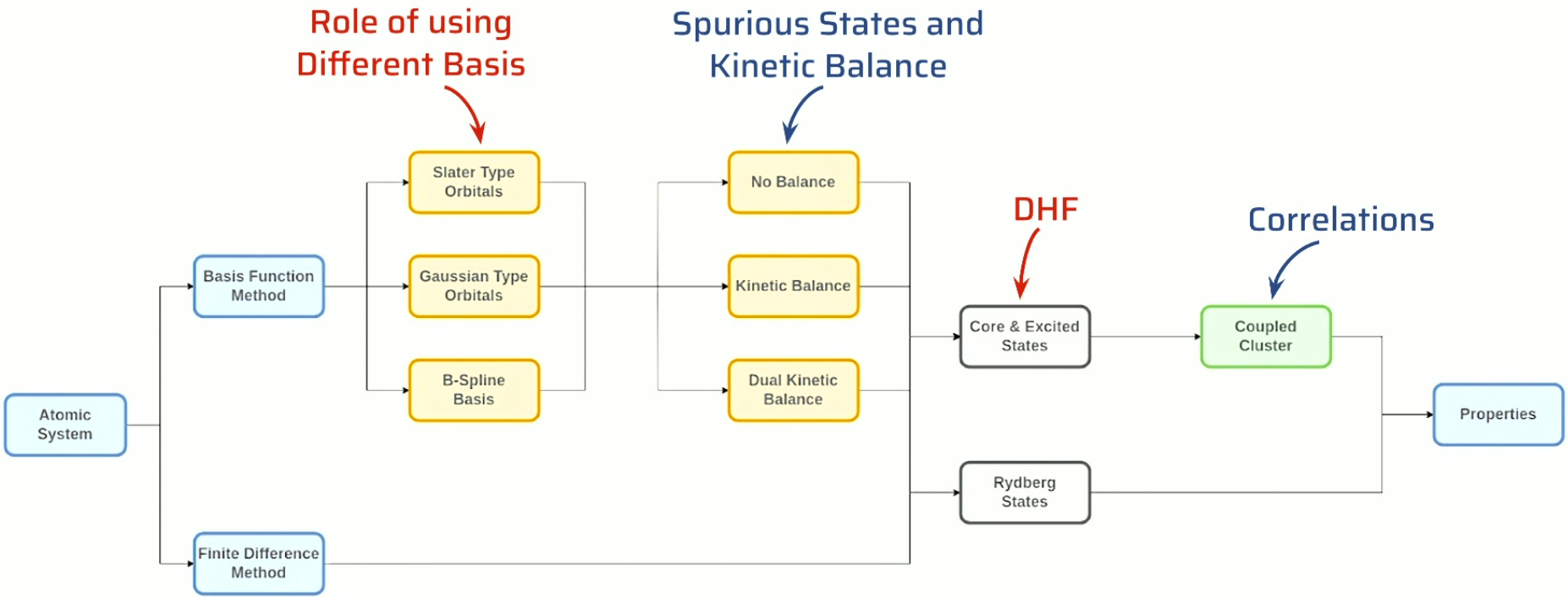
$$Z = \int D\phi e^{i\int d^d x\left((\partial\phi)^2 - F(\phi)\right)}$$

Lorentz Invariant Lagrangian Density of Scalar Field

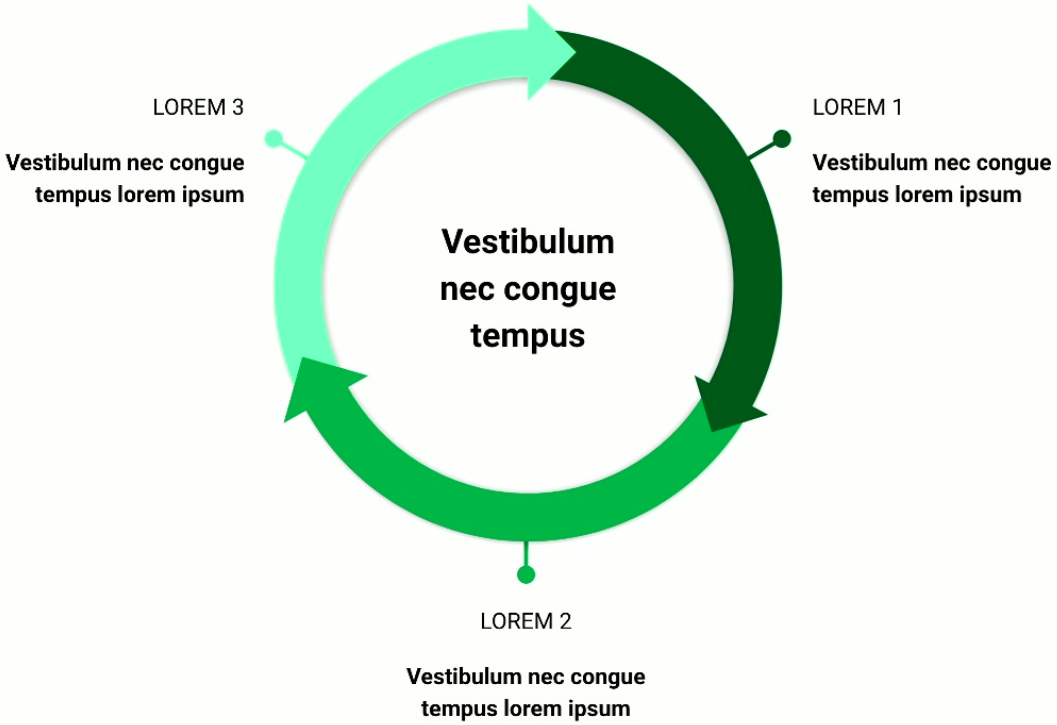
Infinite integrations of ϕ to infinite limits

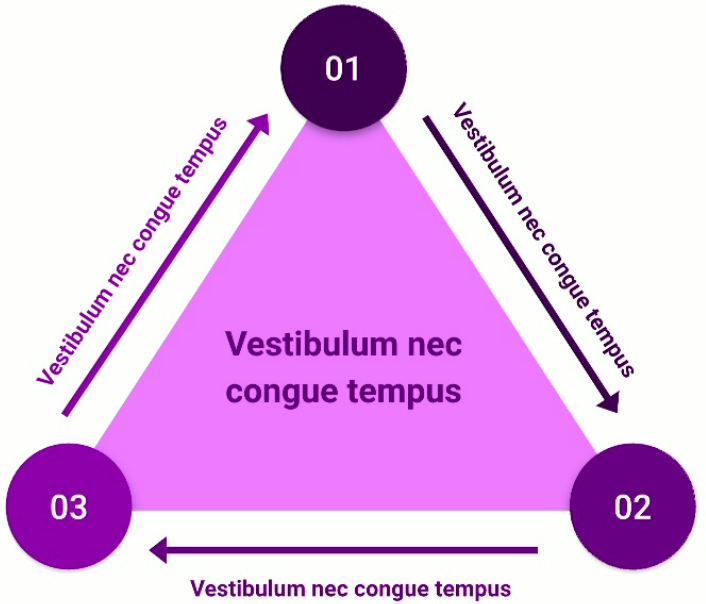
Example

Workflow



SmartArt


LOREM 3
Vestibulum nec congue tempus lorem ipsum
LOREM 1
Vestibulum nec congue tempus lorem ipsum
Vestibulum nec congue tempus
LOREM 2
Vestibulum nec congue tempus lorem ipsum


01
Vestibulum nec congue tempus
Vestibulum nec congue tempus
Vestibulum nec congue tempus
03
02
Vestibulum nec congue tempus

Example

The Which Way Information

When we mark slits with a horizontal and a vertical polarizer the pattern disappears

Click Here

Example

Press esc to exit full screen

Spin Precession On Bloch Sphere

A representation of given quantum state of qubit

$$H = \omega S_z$$

Schrödinger's Approach

t=0 **t=π/ω**

$$|+\rangle_Z \rightarrow |+\rangle_Z$$

$$|+\rangle_X \rightarrow |+\rangle_X$$

$$|+\rangle_Y \rightarrow |-\rangle_Y$$

Example

Spin Precession On Bloch Sphere

A representation of given quantum state of qubit

$$H = \omega S_z$$

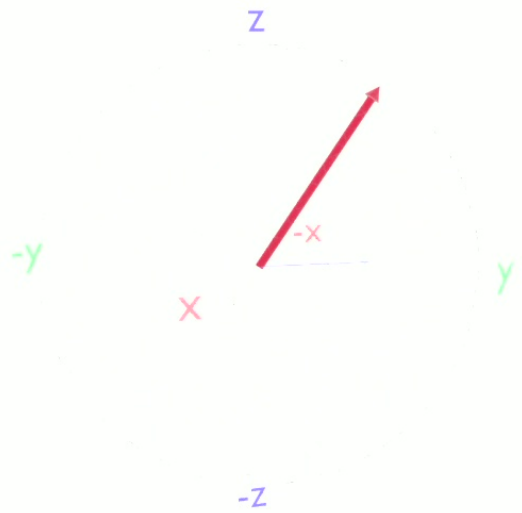
Heisenberg's Approach

t=0 **t=π/ω**

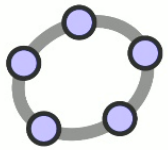
$$S_Z\{|+\rangle_Z, |-\rangle_Z\} \rightarrow S_Z\{|+\rangle_Z, |-\rangle_Z\}$$

$$S_X\{|+\rangle_X, |-\rangle_X\} \rightarrow -S_Y\{|-\rangle_Y, |+\rangle_Y\}$$

$$S_Y\{|+\rangle_Y, |-\rangle_Y\} \rightarrow S_X\{|+\rangle_X, |-\rangle_X\}$$

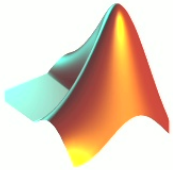


Graphic Tools

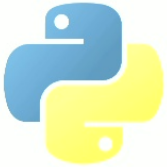


GeoGebra

Desmos



Matlab

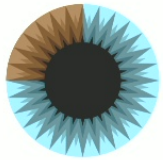


Python

PowerPoint

After Effects

Blender



Manim

Conclusion

1. A strong conclusion summarizes your main points
2. Use an effective and strong closing
   Your audience is likely to remember your last words
3. Suggest future avenues of research
4. Use keywords from your introduction to briefly restate your argument

Project team and collaborators

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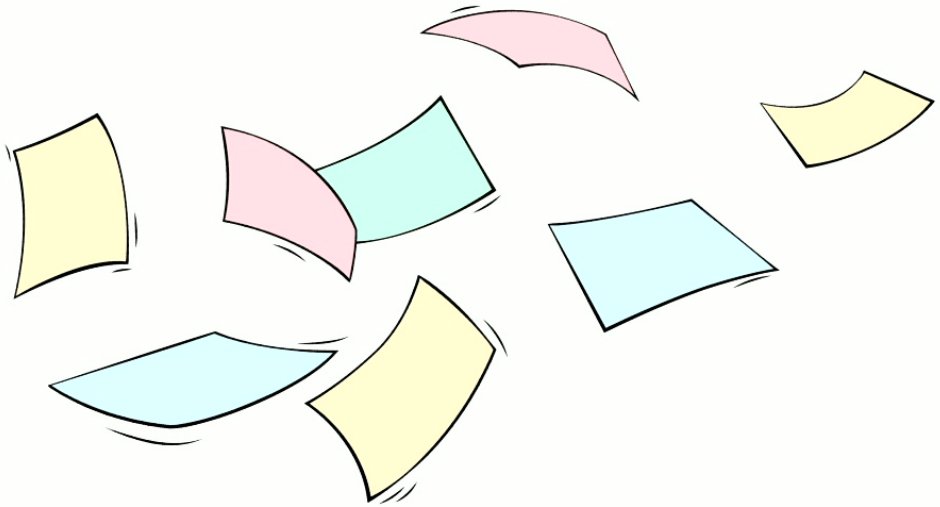
[5]Physical Research Lab, Ahmedabad, India

Extra Slides - Expected Questions



THE INFORMATION

Below is the information we'll be using when designing our slides. *Source: Wikipedia.org*

- Much like the seahorse, the leafy seadragon's name is derived from its resemblance to another creature (in this case, the mythical dragon). While not large, they are slightly larger than most seahorses, growing to about 20–24 cm (8–10 in). They feed on plankton and small crustaceans.
- The lobes of skin that grow on the leafy seadragon provide camouflage, giving it the appearance of seaweed.[4] It is able to maintain the illusion when swimming, appearing to move through the water like a piece of floating seaweed. It can also change color to blend in, but this ability depends on the seadragon's diet, age, location, and stress level.
- The creature feeds by sucking up small crustaceans, such as amphipods and mysid shrimp, plankton, and larval fish through its long, pipe-like snout.

Behold, the majestic leafy seadragon

***5 of The Best PowerPoint Presentation Examples- Option Technologies**

LAYOUT ONE

TITLE SAYS WHAT WE'RE TALKING ABOUT

THE LEAFY SEADRAGON

CRISPY

A seahorse-like creature with unparalleled camouflage.

SUBTITLE GIVES ACCURATE OVERVIEW

THREE KEY TAKEAWAYS

Name	*Appearance*	*Diet*
NO, IT'S NOT REALLY A DRAGON	**IT'S LIKE A SEAHORSE, BUT WAY LEAFIER**	**IT MOSTLY EATS SMALL SHELLFISH & SHRIMP**
		
The leafy seadragon's name is derived from its resemblance to the mythical dragon.	The lobes of skin that grow on the leafy seadragon provide camouflage and make it look like seaweed.	It sucks up amphipods, mysid shrimp, plankton, and larval fish through its long, pipe-like snout.

THREE COLUMNS, DIFFERENT GRAPHICS

SLIGHTLY EDITED COPY

LAYOUT TWO

THE LEAFY SEADRAGON

CRISPY

A seahorse-like creature with unparalleled camouflage.

ONE-SENTENCE SUMMARY

It's like a seahorse, but it's covered in leaf-like lobes and eats small shrimp.

The leafy seadragon's name is derived from its resemblance to the mythical dragon. The lobes of skin that grow on the leafy seadragon provide camouflage and make it look like seaweed. It sucks up amphipods, mysid shrimp, plankton, and larval fish through its long, pipe-like snout.

PHOTOGRAPH INSTEAD OF GRAPHIC

FULL SENTENCES IN CASE PEOPLE NEED TO READ VS. HEAR A VOICE OVER

THE LEAFY SEADRAGON

A seahorse-like creature with unparalleled camouflage.

Named after the dragon

- Resembles a mythical dragon

Slightly larger than most seahorses

- 20–24 cm (8–10 in)
- Lobes of skin look like seaweed
- Can change colors
- Highly camouflaged

Mostly eat small shellfish

- Diet of amphipods, mysid shrimp, plankton, and larval fish
- To eat, uses a long, pipe-like snout

Behold the majestic leafy seadragon!

LAYOUT THREE

THE LEAFY SEADRAGON

CRISPY

A seahorse-like creature with unparalleled camouflage.

MAJOR TAKEAWAYS

PHOTOGRAPH INSTEAD OF GRAPHIC

Named after the dragon

» Resembles a mythical dragon

Slightly larger than most seahorses

» 20–24 cm (8–10 in)

» Lobes of skin look like seaweed

» Can change colors

» Highly camouflaged

AND SUPPORTING, SHORT BULLET POINTS

Mostly eat small shellfish

» Diet of amphipods, mysid shrimp, plankton, and larval fish

» To eat, uses a long, pipe-like snout

Behold the majestic leafy seadragon!

LAYOUT FOUR

THE LEAFY SEADRAGON

A seahorse-like creature with unparalleled camouflage.

MUCH MORE INFORMATION IN PARAGRAPH FORM

CRISPY

THE WELL-CAMOUFLAGED SEADRAGON

Much like the seahorse, the leafy seadragon's name is [illegible] mythical dragon.

PHOTOGRAPH WITH SHORT DESCRIPTION

About

They are slightly larger than most seahorses, growing to about 20–24 cm (8–10 in) and feed on plankton and small crustaceans.

The lobes of skin that grow on the leafy seadragon provide camouflage, giving it the appearance of seaweed. It can also change color to blend in, but this ability depends on the seadragon's diet, age, location, and stress level.

ONE-SENTENCE SUMMARY

It's like a seahorse, but it's covered in leaf-like lobes and eats small shrimp.

Looks like seaweed

Can change colors

Eats small crustaceans

THREE VISUAL TAKEAWAYS


LAYOUT FIVE
LEAFY SEADRAGON
GIANT PHOTOGRAPH
GIANT HEADLINE
THREE, VERY HIGH LEVEL TAKEAWAYS
PERFECT FOR VOICE-OVER CUES
NO, IT'S NOT REALLY A DRAGON
IT'S LIKE A SEAHORSE, BUT WAY LEAFIER
IT MOSTLY EATS SMALL SHELLFISH & SHRIMP