

PHL101: Physics for Engineers

- Modern Physics
- Materials' property

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- Optics
- Electromagnetism

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- Mechanics
- Astrophysics

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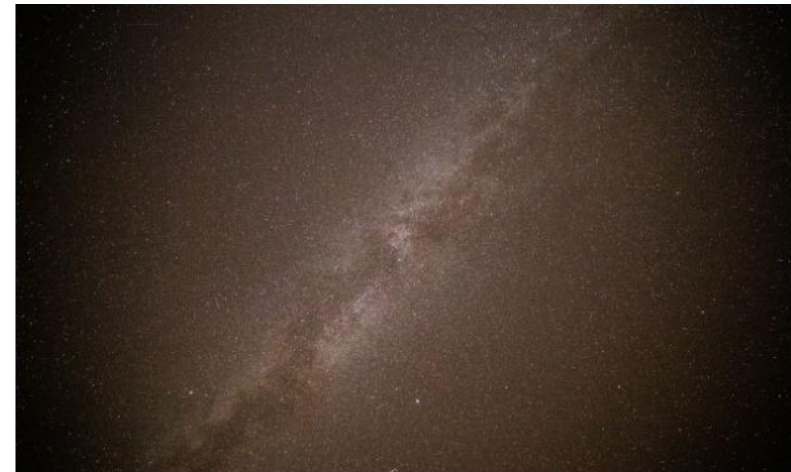


- Nature Lover
- Yoga enthusiastic
- Enjoy Sports, Cooking and Photography

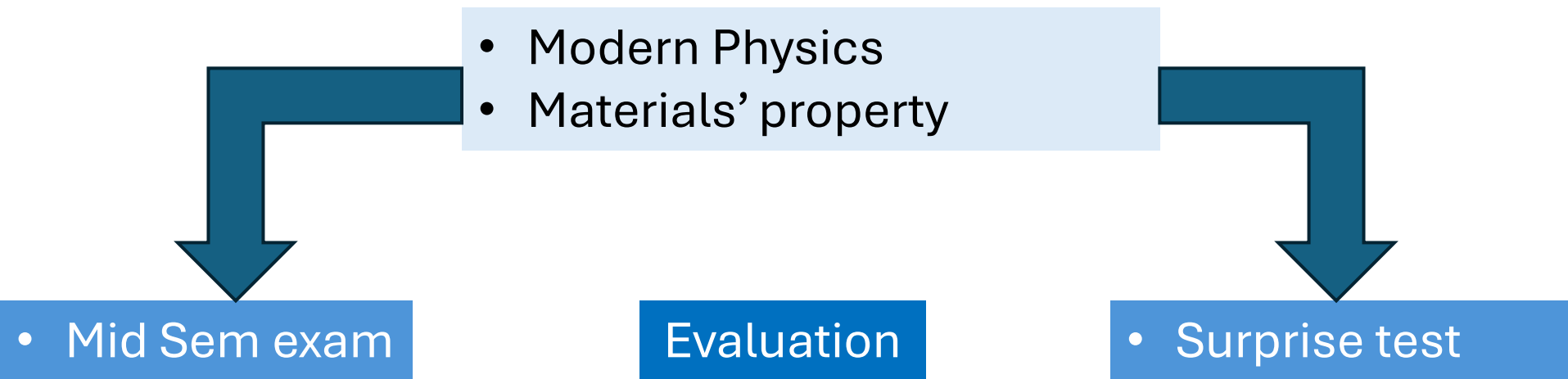
<https://sites.google.com/view/achaudhary/home>

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PHL101_Dr. Anjali Chaudhary



PHL101: Physics for Engineers



- **Physics** is the fundamental science that studies matter, energy, and the interactions between them, encompassing everything from the smallest particles to the vast universe.
- **Modern Physics:** Explores the behaviour of matter and energy at the atomic and subatomic levels, including quantum mechanics and relativity.

Materials' property



Wood

Insulator

Dull appearance



Metal

Conductor

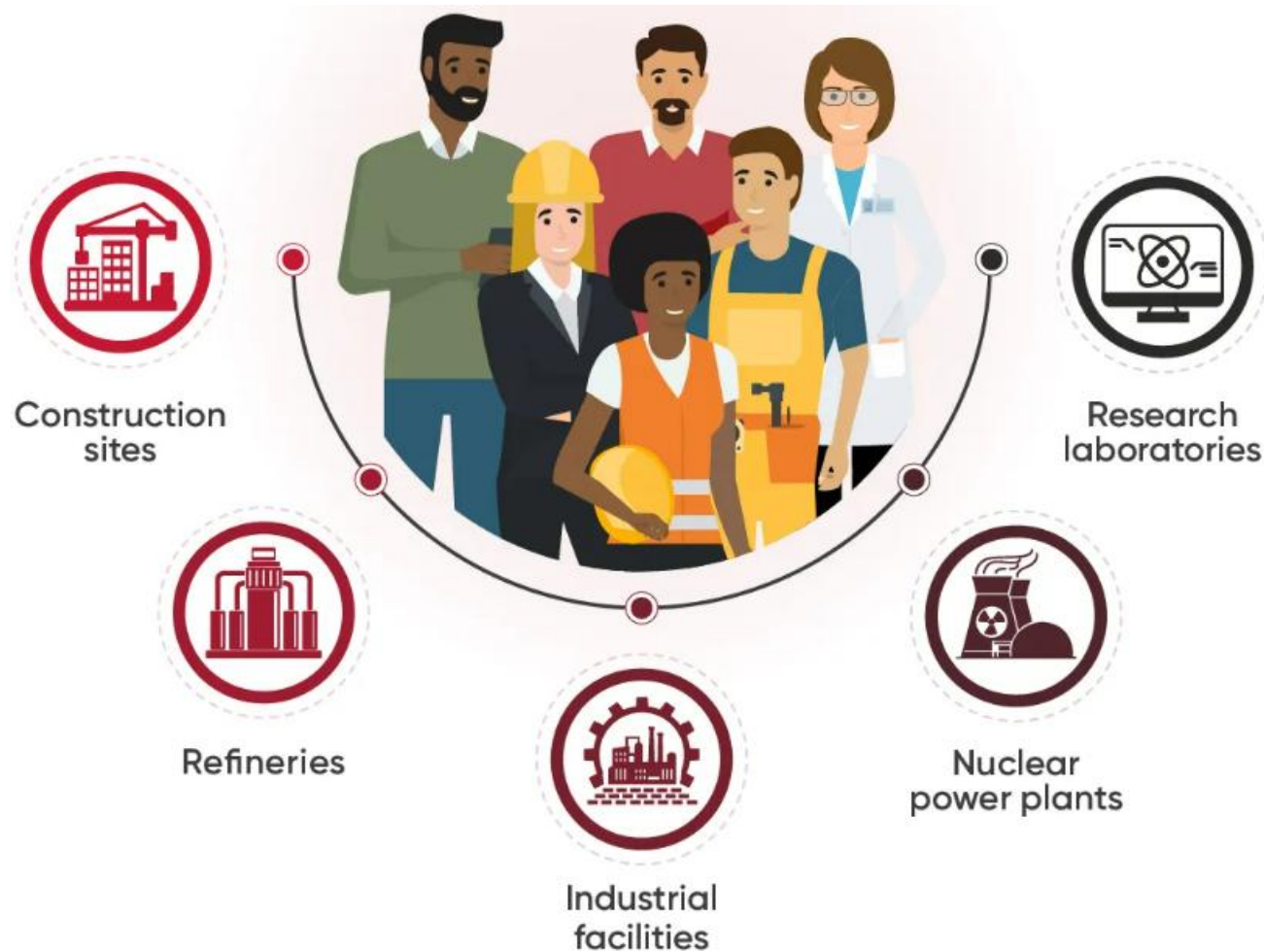
Shinny appearance

Based on a certain **property**, you can **distinguish a material**.

1. Electrical Conductivity
2. Appearance

Materials' property: Why important for engineers?

WHAT ENGINEERS DO?



Materials' property: Why important for engineers?

1. Pick **Application** → Determine required **Properties**

Properties: mechanical, electrical, thermal, magnetic, optical.

2. **Properties** → Identify candidate **Material(s)**

Material: structure, composition.

3. **Material** → Identify required **Processing**

Processing: change *structure* and overall *shape*
ex: casting, sintering, vapor deposition, doping
forming, joining, annealing.

Basic Understanding on Materials' properties is important

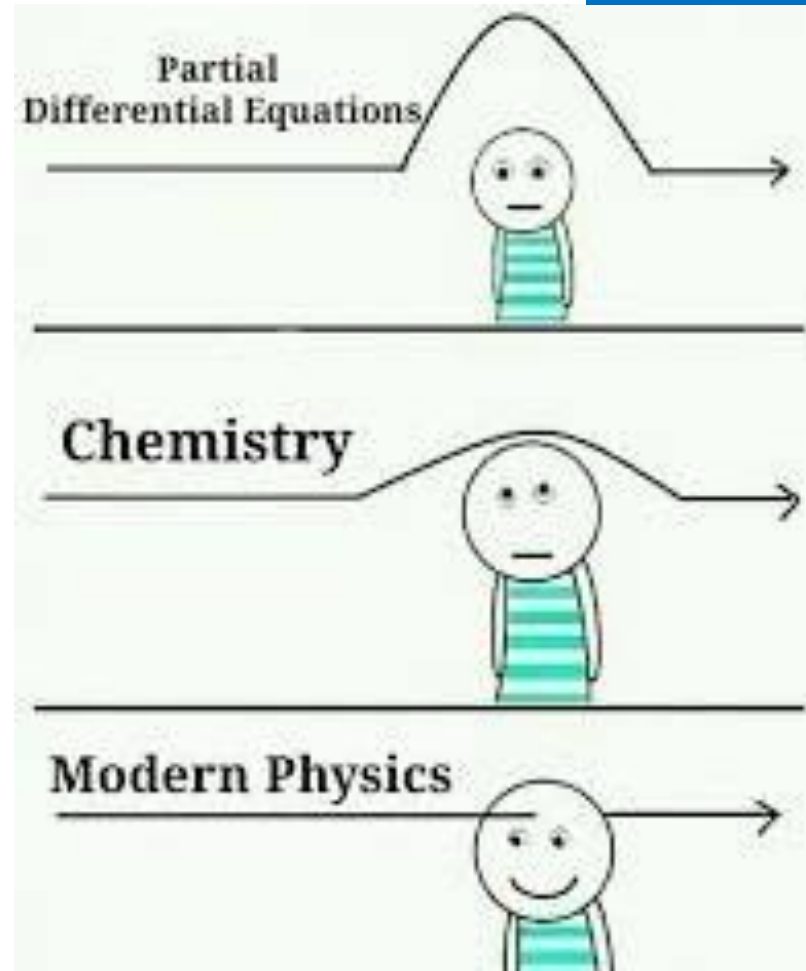
Materials' property: Example from my lab

1. Pick **Application** → Determine required **Properties**
Photodetector electrical and optical
2. **Properties** → Identify candidate **Material(s)**
Material: Semiconductor
1. Electrical Conductivity between metals and insulators
You can tune the conductivity of semiconductor
2. Optical
3. **Material** → Identify required **Processing**
Processing: change *structure* and overall *shape*
ex: lithography and etching

Modern Physics

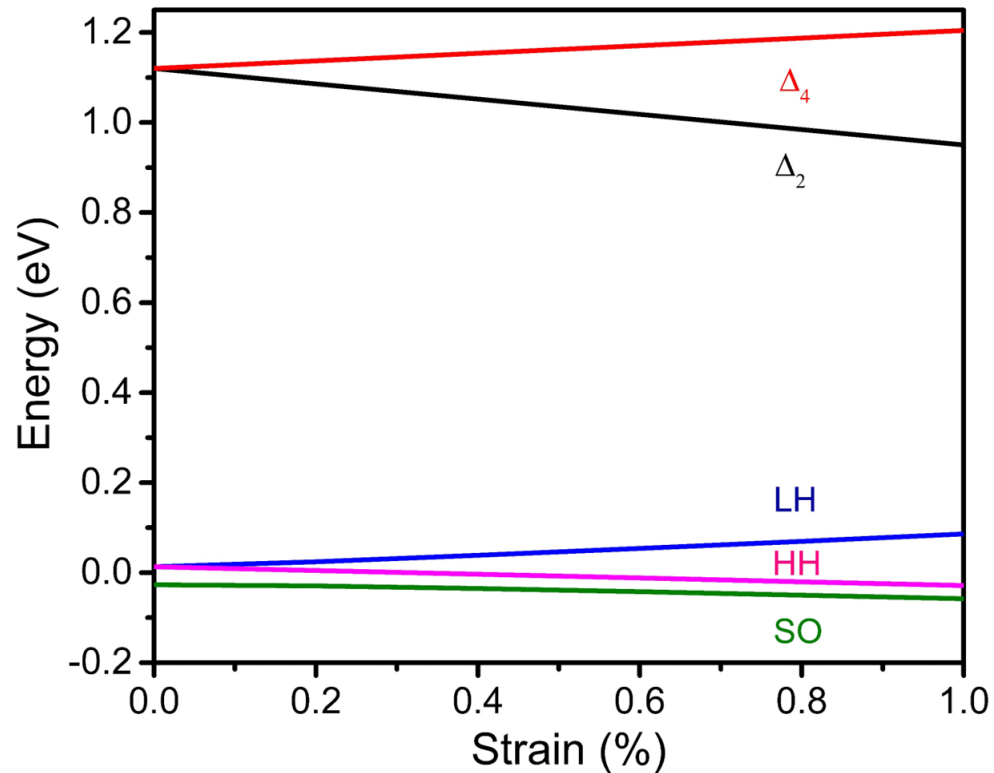
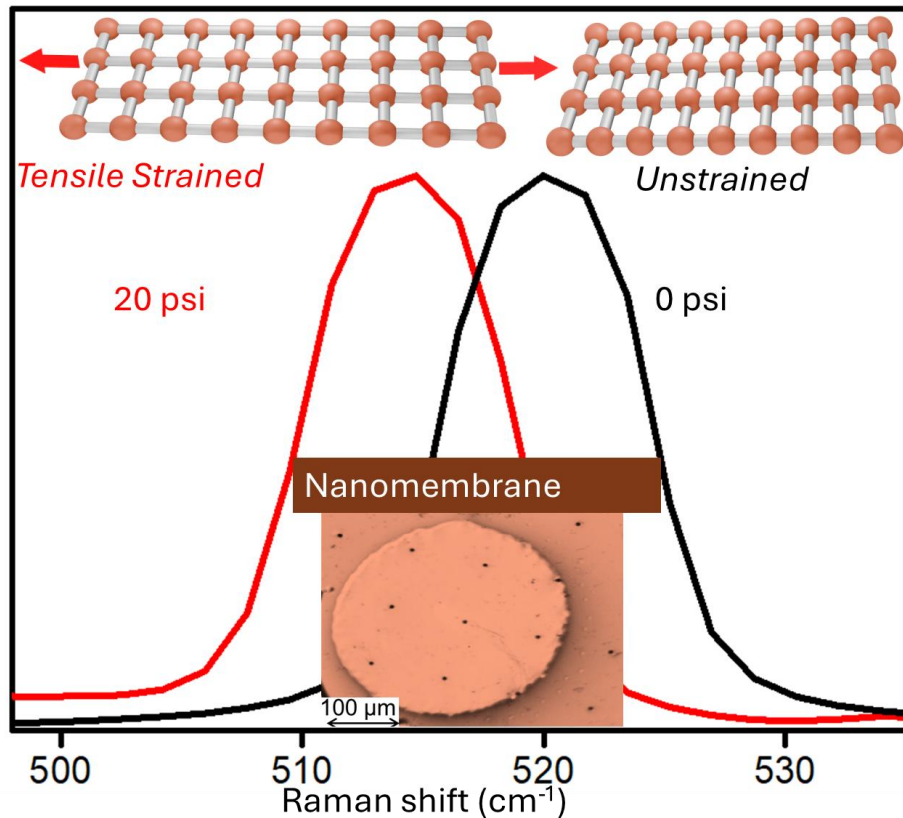
Gen Z...I think is modern...

so you must also be aware of **MODERN PHYSICS**



Modern Physics: Example from my lab

- Tuning the atomic structure of Si using strain



Experiment tells --> Si is strained

Theoretical calculations -->
atomic structure of Si changes

Ref : <https://pubs.acs.org/doi/full/10.1021/acsnm.5c00242>

When you start a **class** and
your new **Instructor** says,
“We’re **here to study**”



And your reaction right now



Google classroom

xzhkpu3m

Class will start at 10:35 am,
no one is allowed to enter after that