Brief History of Optics

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  - The last era started with the dawn of twentieth century with emergence of new and revolutionary ideas in physics and communication technology.

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  - **Epicurus (341 BC–270 BC):** Atoms flow continuously from the body of the object into the eye. However the body does not shrink because other particles replace and fill in the empty space.

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- That means, our vision is initiated by our eyes reaching out to touch or feel something at a distance. This is the essence of *extramission theory of light* that was remain influential for almost a 1000 years until **Alhazen** was able to prove it to be wrong.

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  - Things seen under more angles are seen more clearly.
- However, Euclid did not define the physical nature of these visual rays.

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  - He carried out careful experiments on refraction and concluded that (small angle case),

$$\boxed{\text{Incidence angle} \propto \text{Refraction angle}}$$

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- Al-Mamun showed great interest in the progress of the House of Wisdom to have intellectual discussions with the scholars coming from different parts of the world.

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  - However, credit goes to Snell.
    Ibn Sahl did not state the law of refraction explicitly; it was hidden as a sort of lemma and his emphasis was on the focusing property of lenses.

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- This book remained an influential text for transition from the Greek ideas about light and to the modern day optics.
- Denied the extramission theory and established the theory of light emission from glowing object through experiments.

- **Alhazen's problem** (first formulated by Ptolemy in 150 AD)
  Draw lines from two points in the plane of a circle such that they meet at a point on the circumference, making equal angles with the normal at that point. The problem was to locate this point.

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- This problem remained unsolved using algebraic methods and it was finally solved in 1997 by the mathematician Peter M. Neumann.

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- Kepler was able to formulate a satisfactory theory of radiation through apertures based on the rectilinear propagation of light rays

- **René Descartes (1590–1650) :**

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- Until Kepler, the main motivation of studying the nature of light came from a desire to understand vision.
  but Descarte concerned himseld to explore intrinsic nature of light and the laws of optics.