



Speed of Light

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The [speed of light](#), a **fundamental constant in physics**, has been determined with increasing precision over centuries.

- The speed of light is the rate at which light waves **propagate through different materials**. In particular, the **speed of light in a vacuum** is defined as exactly **299,792,458 meters per second**.
 - Light's speed can vary when it propagates through different materials, depending on the **material's refractive index** (measure of bending of a light ray when passing from one medium to another).
- Early estimates of the speed of light were based on **how long it took light to travel a known distance**, with measurements improving as instruments advanced.
- **Ole Roemer (1676)** was the **first to estimate the speed of light**, observing Jupiter's moons and their varying eclipse timings based on Earth's distance from Jupiter.
 - His estimate was 225,300 km/s, which was far from the modern value due to limited knowledge of Jupiter's distance.
- Modern measurements of the speed of light are conducted using **laser beams and atomic clocks**, resulting in the current precise value.

Read more: [Time Dilation in Early Universe](#)

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