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Measuring the velocity of light

Lab-report in Physics
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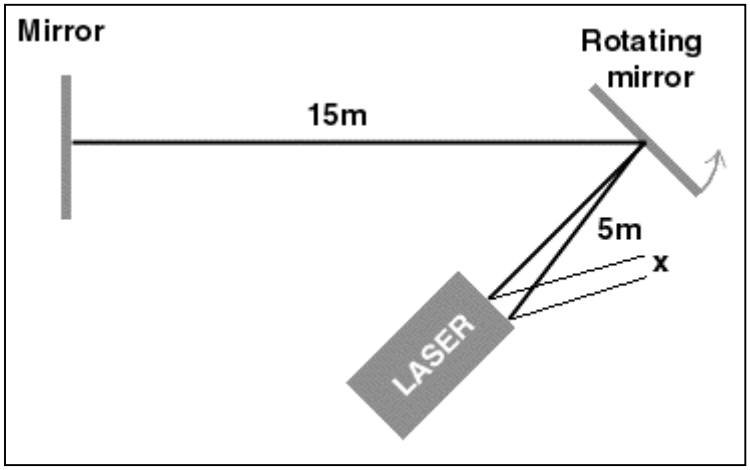
The aim of this experiment is to measure the speed of light in an experiment available to do at school. The principle is quite simple. Let a ray of light strike a rotating mirror that reflects the light three meters away to a second mirror, so that the light is reflected back at the rotating mirror and back to the laser. The rotating mirror has during the time it took for the light to travel the six meters to the second mirror and back rotated some degrees and the light spot has moved from the origin. And if you know how fast the mirror is rotating, you can calculate how fast the light is traveling. The apparatus is set up like the figure below shows. When we did the experiment and measured, x was measured to approximately 3.0 mm – 3.5 mm.



So we know that the velocity of light is the distance it travels divided by the time it takes ($c = d / t$), and the distance is 30 meters since the light should travel to the second mirror and back. The how do we know how long time it takes? Well, if we use a tuning fork we can set the mirror to do 512 rotations per second. And since we know the distance between the rotating mirror and the laser, and the angular velocity of the rotating mirror, we can calculate how long time it takes. So

$\theta = x / 10 = 3_E\text{-}4$
$T = 1 / 512 \approx 0.001953$

$t = \theta / 2\pi * T = (0.3_E\text{-}4 \text{ m} / 2\pi) * (1 / 512) = 9.32_E\text{-}8$

Then,

$c = d / t = 30 / 9.32_E\text{-}8 \approx 321719678 \text{ m/s} \approx 322\,000 \text{ km/s}$

When we are measuring these small distances with a ruler, and using such high velocities as the speed of light, it is very hard to be precise and the result may vary quite much. According to the book the velocity of light is 299,792,458 m/s, so it wasn't that bad measured, but on the other hand, the difference is approximately 22,000km/s which is a very high velocity.