

Instruments:

- laser
- square beaker
- liquid soap
- water
- vaporizer/fog machine

Experiment:

- Fill the beaker with water and add a few drops of liquid soap.
- Create a fog of water droplets on the surface of the water and shine the laser beam through it so that it hits the water surface obliquely.

Observations:

At the point where the laser beam goes from the water into the droplets, refraction of the beam is visible.

Results:

Water and air (fog) possess different optical densities. This means that the speed at which light travels changes when entering a different substance. This is comparable to a car driving with its left front tire on the asphalt and its right front tire on grass. The reduced friction on the grass causes the right tire to turn faster and pull the car towards the meadow.

This can be transferred to the two media in this experiment and shows refraction stemming from the angle of incidence.

Additionally, an exacting look at the water surface reveals a reflected beam of light, whose intensity is very faint (roughly 4 %).

If we switch the light beam to a position under the beaker, we see refraction in the other direction (from the angle of exit).