MICRO-523: Optical Detectors

Week Two: Optical Methods –Selected Examples

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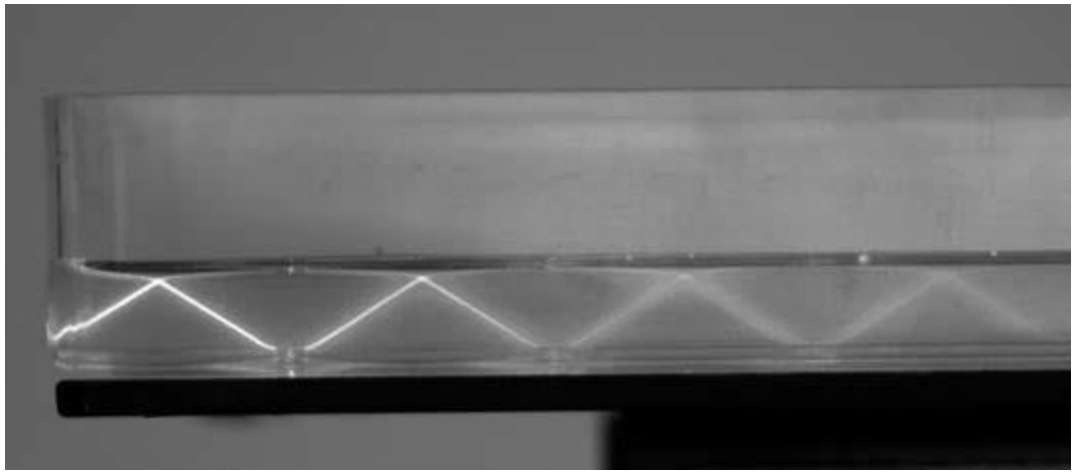
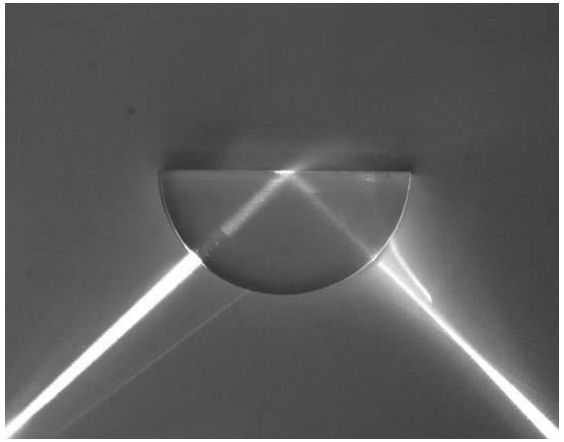
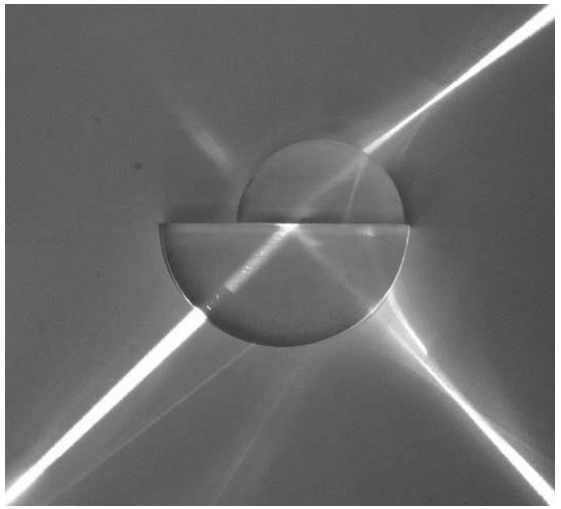
Homework 1: Rain Sensor

Design a rain sensor for a car windshield based on these experiments.

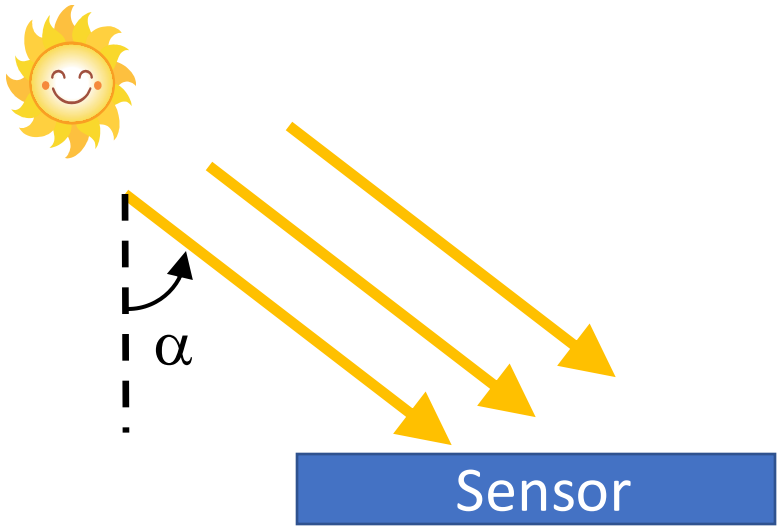






Hints: water presence → total internal reflection
What happens when there is a gap?

Homework 2: Sun Sensor



Hint: sun at ∞, α to be determined
Make it as easy as possible → PSD?

Design a sensor to measure the azimuth and the elevation of the sun!

A potential application could be to guide a satellite.

1) Location sensor:
-S.W. Janson «micro/nanotechnology for picosatellites», 22nd Annual AIAA/USU Conference on small satellites, paper SSC08-VII-6

2) Camera:
-N. Xie, A. Theuwissen, «Low-power high-accuracy micro-digital sun sensor by means of a CMOS image sensor», Journal of Electronic Imaging 22(3), 033030 (Jul–Sep 2013)