

7. (20 points) Sun dogs are an optical atmospheric phenomenon similar to rainbows. In a sun dog a rainbow-like, (though typically less well defined) colored halo forms around the sun. These arcs are caused by the diffraction and dispersion of light from the sun through hexagonal ice crystals in the sky. Dispersion happens because the index of refraction for ice for 660. nm red light is 1.306 and for 410. nm violet light is 1.317. In this example, assume that white light from the sun's is incident onto the ice crystals at an angle of 40.77° . (Recall that the internal angles at the corners of a hexagon are 120° and that the sum of the internal angles of a quadrilateral is 360°).

- Find the frequencies of the red and violet light mentioned above.
- Label the relevant angles on the figure.
- Find the difference between the angle red light and the angle violet light refracts through the ice crystals.

