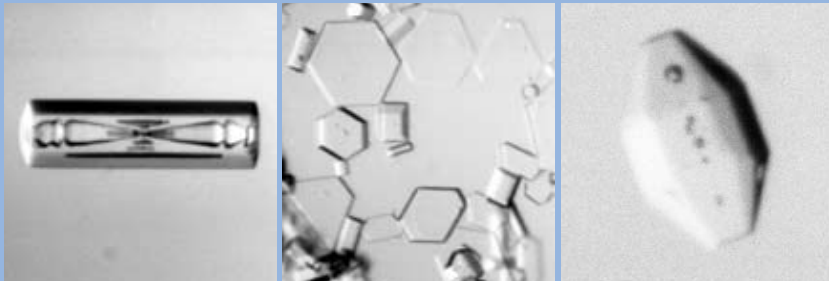


ICE CRYSTAL GEOMETRY Ice crystals that produce the most common halos and arcs are hexagonal in cross section, and their opposing or adjacent faces create the angles of effective 60° and 90° prisms. A crystal is called a column if its principal axis is longer than its diameter, and a plate if it is much shorter. Columns capped with a pyramid on one or both ends, which may be pointed or truncated, may have up to twenty faces and eighteen different pathways on which light can travel on its way through the crystal.

The 22° halo is produced as light deviates 22° through an effective 60° prism. The 46° halo is produced as light deviates 46° through an effective 90° prism between a column's prism and basal faces. Angles between pyramidal crystal faces can vary from 28° to over 80° , deviating light from 9° to 35° , and producing other sizes of circular halos.



BASIC ICE CRYSTAL SHAPES These crystals, shown here in microscopic photography at the South Pole, Antarctica, demonstrate the variety of shapes. Left: Columns have one axis much longer than the other. Center: Plates have a much shorter principal axis. Right: Pyramidal crystal faces taper to a point. Note also that there may be hollow spaces within the crystals, which also affect the pathways of light passing through them.

Other variations of crystal shape, length, width, diameter, orientation, and incident angles of light, with multiple combinations of refractions and internal and external reflections, produce a multitude of luminous streaks and spots.