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Finding the shape of glowing objects from the polarization of light emitted.[1] KEELEY TOWNLEY-SMITH, AZAM NURUL, SUZANNE WHEELER, CRISTIAN BAHRIM, Lamar University — It is hard to find the geometric shape of a glowing object because of the impossibility to make physical contact. Instead, we intend to use the light emitted by the object. In developing a reliable optical method, we use the filament of a light bulb encapsulated in a cavity which has a wide opening that allows us direct observation of the filament. We cover the wide opening with smaller openings of circular, triangular, and star shapes. A circular opening allows us to assess the general shape and orientation of the filament, which is located on a top view along the optical axis of the polarizer – light detector system. Two polarizers aligned on the optical bench are used to measure the variation of the light emitted by the various openings and comparison with Malus' law is done. A triangular shaped opening located higher or lower in front of the filament allows us to assess its eccentricity. We clearly observe that the brightness of the glowing object and the luminosity of the surrounding light are two important factors in extracting the object's shape. Thus, dimmer the glowing object, closer to a uniform light source the cavity appears in measurements for any shaped opening. The eccentricity of a glowing object is extracted from the departure of the light signal from the Malus' law of constant amplitude. In particular the points of inflection (maxima and minima) are modified greatly when a strongly elliptical or a cornered shaped object are used.

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