A Thermal Model for the Secular Light Curve of the Comets 1P/Halley, C/1996 B2 (Hyakutake) and 67P/Churyumov-Gerasimenko.

Rondón.E. Universidad de Los Andes (erondon@ula.ve)

The Secular light curve of comets gives a large amount of physical information on the cometary nucleus. We have developed a model that allows the prediction of the secular light curve for different comets, from which we derive parameters like the orientation of the rotation axis (I, Φ) the temperatures on the surfaces and the temperatures in the internal layers of the nucleus. To begin we have modeling the water production rate for several active regions and using the correlation equation between the water production rate and the visual magnitude we can model the secular light curve of any comet. We obtain probable orientation of the rotation axis (I, Φ) . These orientations are compared with several solutions by several authors. We have calculated the surface temperature for the orientation of the rotation axis with minimal standard deviation. We found that the thermal conductivity does not influence the secular light curve. The secular light curve cannot be explained in the post-perihelion phase only using the H_2O molecule. We have included a thermal model with multi molecules, H_2O and CO_2 that allows us predict the secular light curve of the comet in the pre and post perihelion phase.