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THE BEHAVIOR OF THE PLANETARY RINGS UNDER THE KOZAI MECHANISM

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Rings are one of the main feature of almost all giant planets in the Solar System. Even though thousands of exoplanets have been discovered to date, no evidence of exoplanetary rings have been found despite the effort made in the development and enhancing of techniques and methods for direct or indirect detection. In the transit of a ringed planet, the dynamic of the ring itself could play a meaningful role due to the so called Kozai Mechanism (KM) acting on each particle of it. When some specific initial conditions of the ring are fulfilled (as a ring inclination greater than $\sim 39°$), KM generates short periodic changes in the inclination and eccentricity of each particle, leading to a meaningful characteristic collective behavior of the ring: it changes its width, inclination and optical depth.

These changes induce periodic variations on the eclipsed area of the parent star, generating slight changes in the observed transit signal. Under this mechanism, light curves depths and shapes oscillate according to the fluctuations of the ring. To show this effect we have performed numerical simulations of the dynamic of a system of particles to asses the ring inclination and width variations over time. We have calculated the expected variations in the transit depth and finally, we have estimated the effect on the light curve of a hypothetical ringed exoplanet affected by the KM. The detection of this effect could be used as an alternative method to detect/confirm exoplanetary rings, and also it could be considered as a way to explain anomalous light curves patterns of exoplanets, as the case of KIC 8462852 star.

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ALBEDOS AND SPECTRAL SIGNATURES DETERMINATION AND IT CONNECTION TO GEOLOGICAL PROCESSES: SIMILE BETWEEN EARTH AND OTHER SOLAR SYSTEM BODIES

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Remote sensing has always been the best investigation tool for planetary sciences. In this research have been used data of Surface albedo, electromagnetic spectra and satelital imagery in search of understanding glacier dynamics in some bodies of the solar system, and how it's related to their compositions and associated geological processes, this methodology is very common in icy moons studies.

Through analytic software's some albedos map's and geomorphological analysis were made that allow interpretation of different types of ice in the glacier's and it's interaction with other materials, almost all the images were worked in the visible and infrared ranges of the spectrum; spectral data were later used to connect the reflectance whit chemical and reologic properties of the compounds studied.

It have been concluded that the albedo analysis is an effective tool to differentiate materials in the bodies surfaces, but the application of spectral data is necessary to know the exact compounds of the glaciers and to have a better understanding of the icy bodies.

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