PAINEL 260

THE ROLE OF RESONANCE STICKINESS IN THE DYNAMICAL TRANSFER OF COMETS TO THE ASTEROID BELT

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Resonance stickiness takes place when a near resonant orbit becomes temporarily captured in a resonant regime near the separatrix. The sticky orbit normally shows a remarkable chaoticity but it may survive in such chaotic regime for a very long time span (much longer than the typical time scale of resonant motion near the separatrix). In this work we analyze the probability of temporary capture of Jupiter family comets-like orbits in the main asteroidal mean motion resonances, and discuss the role of resonance stickiness in these capture processes. We numerically simulate the evolution of several hundreds of Jupiter family comets clones, under the perturbation of planets from Venus to Neptune. By considering the percentage of bodies temporarily captured in the main mean motion resonances with Jupiter (1: 1, 2: 1, 3: 2, 4: 3 and 5: 2) we statistically determine how many cometary bodies we would expect to observe in typical asteroidal resonant orbits. Preliminary results indicate that there would be a few inactive comets in the 2: 1, 3: 2 and 4: 3 resonance at present times, which may be members of the populations of strongly chaotic asteroids detected in such resonances.

PAINEL 261

INTERACTING ELLIPSOIDS: A MINIMAL MODEL FOR THE DYNAMICS OF RUBBLE-PILE BODIES

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Rubble-pile asteroids are strength-less bodies formed by the gravitational re-accumulation of fragments after the breakup of large asteroids during energetic collisional events. Many collisional processes in the Solar System, like the formation of asteroid families, the tidal disruption of comets and NEAs and the formation of asteroid binaries and satellites may involve parent bodies with a rubble pile structure. We present here the results of a simple mechanical model recently introduced to study the dynamics of such kind of asteroids. In this model, a rubble-pile consists of N interacting fragments represented by rigid ellipsoids, and the equations of motion explicitly incorporate the minimal degrees of freedom necessary to describe the attitude and rotational state of each fragment. We perform different tests of this model and compare the results with those from hydrodynamical models and laboratory experiments. We find that, in spite of its simplicity, the model succeeds to reproduce most of the features expected from typical collisional events, and the energy and angular momentum transfer during high velocity collisions is well behaved.

PAINEL 262

SOBRE A ATIVIDADE PÓS-PERIÉLICA DO COMETA DE ÓRBITA PARABÓLICA YANAKA (1988r)

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Greenberg, Singh & de Almeida (ApJ, 414: L45-48, 1993) mostraram que a deficiência nas abundâncias observadas de C_2 e CN no Cometa Yanaka (1988r) pode ser explicada em termos das propriedades dos seus componentes refratários orgânicos, além do fato que trata-se de um cometa dinamicamente novo, observado através de abertura de fenda pequena projetada muito próximo do núcleo. Neste trabalho, complementamos o estudo sobre a atividade deste cometa de órbita parabólica, através da determinação da lei de potência que exprime sua taxa de produção de H_2O (o principal indicador de atividade) na fase pós-periélica, determinamos o raio nuclear efetivo mínimo com sua fração de área ativa e analisamos a emissão de partículas de poeira observadas no contínuo em 625,0 nm.

PAINEL 263

ASTEROID FAMILIES: OBSERVATIONAL RESULTS VERSUS NUMERICAL SIMULATIONS

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Asteroids families are groups of small bodies that share certain orbital and spectral properties. Families are concentrations in the proper elements phase space. It is believed that they are the result of energetic collisions that break-up and disperse the original parent bodies. In this presentation we compare the rotational periods of family members measured by observations made in Observatorio Pico dos Dias, Estacion Astrofisica Bosque Alegre and Casleo observatories to the rotational periods resulting from simulations of the collisional breakup of a rubble pile asteroid using a model recently developed by us. We used the observed light curves of asteroids members of the Maria and Themis families to estimate the period and shape of each object. Themis and Maria families have around 300 and 150 members, respectively. Our observation consist of 10 members of the Maria Family and 12 from Themis family, adding this to the data from the literature we have a data set of 33 objects for Themis and 20 for Maria. The estimated shapes of the objects are fed into the model in order to obtain a distribution of rotational periods after break-up. This distribution is then compared to the observed distribution. The observed and simulated

distributions show some differences due to the fact that the observed distribution were affected by the subsequent collisional evolution of the family after its formation, but overall shapes are comparable.

PAINEL 264

RELATIVISTIC THERMAL REEMISSION ON ASTEROIDS

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The work presented here shows the development of a thermal model applied to aste- roid fragments where the temperature of each surface point is adapted in order to take into account the Doppler effect. The direct relation between photon frequency and temperature allow us to obtain a new temperature distribution for the asteroid's surface. This new temperature distribution leads to the so called Relativistic Thermal Reemission model that provides a new force: the relativistic thermal reemission force. This new force has a component similar to the well-known Poynting-Robertson (PR) effect. However, in this case, the PR-like force appears as a consequence of the Doppler effect on photons reemitted with non-isotropic patterns. The analysis of the PR-like force indicates that the maximum PR effect does not occur when the velocity is near to the limit *c*, but for lower velocity values. In fact, the PR effect decreases to zero when the body approaches the velocity of light. The behavior of asteroid fragments under the effect of these new forces is discussed and some important results are shown. Finally, one of the main conclusions of this work is that most of the several disturbing forces can be unified, leading to a new and simple physical point of view, able to improve the understanding of the physics involved in the radiation processes and to provide more accurate and complete equations for the non-gravitational disturbing forces.