Physical & Environmental Sciences
UNIVERSITY OF TORONTO
SCARBOROUGH

The Centre for Planetary Sciences Presents Planet Day

Wednesday March 8th 2017 University of Toronto, Scarborough campus Room AA160

Renu Malhotra

A few points on the dynamical evolution of the young solar system

Abstract:

The phenomenon of planetesimal-driven giant planet migration in the early history of our planetary system has become increasingly recognized as a key process for understanding the overall solar system architecture and its dynamical evolution. The dynamical structure of the Kuiper belt indicates that such migration caused Neptune's orbit to expand outward from its birth orbit by about 10 AU. It follows from energy and angular momentum conservation that a few tens of earth-masses of leftover planetesimals were ejected from the early solar system, and that Jupiter migrated inward by a few tenths of an AU. The orbital distribution of asteroids near resonances provides independent estimates of Jupiter's and Saturn's migration. An initially slow migration of the giant planets may have been accelerated during a brief but dramatic orbital instability due to planet-planet resonant encounters. While there is compelling evidence in the outer solar system for the above scenario, there is also tension with the observed properties of the inner solar system: the migration of the giant planets, with or without resonant encounters, would have caused severe, potentially destabilizing, perturbations on the inner planets' orbits. I will describe these considerations and some ideas for resolving this crisis in our understanding of the dynamical history of the solar system.

David Jewitt

Active Asteroids

Abstract:

We have discovered a set of main-belt asteroids distinguished by their propensity to eject dust, giving them an unexpected comet-like appearance. While some active asteroids are, indeed, ice-containing bodies in transient sublimation, activity in others is due to impact, to landslides and even to complete disintegration of the parent body. At first just a curiosity, the active asteroids relate to a number of interesting solar system issues, including the origin of the oceans, the physics of impact, the physics of rotational instability, the production of interplanetary dust and the ultimate fate of the asteroids.

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Yanqin Wu

The Sizes of Kuiper Belt Objects

Abstract: Kuiper Belt Objects are often touted as fossil records of the early Solar System. So what can we learn from them? Here I will discuss one important aspect, their primordial size distribution: is it top-heavy with most of the initial mass absorbed into large bodies like Pluto, or is it bottom-heavy with most of the mass locked into km-sized boulders and only a minute fraction running away to form Plutos?

These two models assume different conditions in the early Solar system, rely on different dynamical processes, and make different predictions for a multitude of observables. These include, e.g., the outward migration of Neptune, crater counts on Pluto, new comets from the Oort cloud, and, further afield, the looks of extra-solar debris disks.

Schedule of Events

9:15am: Bus leaves from St. George (from corner of Huron and Russell Street)
10:00am: Coffee, Tea, and Cookies (AA160)
10:30am: First Speaker: [R. Malhotra] (AA160)
12:00pm: Second bus from St. George departs for UTSC
12:00-1:30pm: Lunch time (AA160)
1:00pm: First bus departs UTSC for St. George
1:30pm: Second speaker [D. Jewitt] (AA160)
2:30pm: Third bus departs UTSC for St. George (*extra bus ride*)
3:00pm: Coffee, Tea and Cookie break (AA160)
3:30pm: Third speaker: [Y. Wu] (AA160)
5:00pm: Wine and Cheese social (AA160)
6:00pm: Final bus departs UTSC for St. George

Additional Information

- Onsite Wifi: The "UofT" network will be available in the MW building, with the same credentials as on the StG campus.

- Food & Beverages: Lunch will be provided.

- Map of Scarborough campus Section B4 (Arts & Administrative = AA):

http://www.utsc.utoronto.ca/utsc_campus.html