THE CHINESE UNIVERSITY OF HONG KONG

Department of Physics

SEMINAR

Hydrodynamical Simulations of Planet Ablation in Stellar Envelopes

by

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Time: 1:30 - 2:15 p.m.
Place: Rm. 311, Science Centre North Block, CUHK

ALL INTERESTED ARE WELCOME
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Abstract

The majority of stars host short-period planets that would be engulfed as the host star expands during its post-main-sequence evolution. Planetary engulfment events have been suggested to be the cause of some stars with anomalously high abundances in lithium and refractory elements and fast-rotating giants. In our previous work, we produced 3D "global" simulations of a hot Jupiter spiralling inside a red giant envelope. We found that significant amount of the hot Jupiter's mass is ablated inside the convective zone, possibly leading to surface chemical pollution signatures in the host star. However, the mass ablation rates have not fully converged due to limited resolution that can be placed in the planet while capturing the entire giant star. I present new converged simulations of planet mass ablation that focus on the vicinity of the planet in a "wind tunnel" setup, and compare the results with analytical models of ram-pressure drag force and mass ablation.