

4CF12-2012-020035

Abstract for an Invited Paper
for the 4CF12 Meeting of
the American Physical Society

Dynamical Evolution of the Solar System

HAL LEVINSON, Southwest Research Institute

Our understanding of planet formation has advanced significantly in the last decade due to a combination of the discovery of extra-solar planetary systems and advancements in our ability to construct computer models. Even so, the standard model of planet formation has difficulties explaining some of the features observed in our Solar System. Of particular note, it predicts that Mars should be as massive as the Earth. In addition, it has difficulty in building the the giant planets, which are made mainly of hydrogen, before the nebula disappeared. In this talk I will review the standard model of planet formation. Then I will argue that current models are missing two important processes - planetesimal-driven migration and collisional grinding. I will present new simulations that include these processes. Preliminary results suggest a heretofore unknown and radical mechanism for building the outer planets.