Abstract Submitted
for the 4CF10 Meeting of
The American Physical Society

Obliquity variations in stable, high-inclination planetary systems and the impact on the habitable zone JOHN ARMSTRONG, Weber State University, RORY BARNES, SHAWN DOMAGAL-GOLDMAN, Virtual Planetary Laboratory, VIRTUAL PLANETARY LABORATORY COLLABORATION, WEBER STATE UNIVERSITY COLLABORATION — We explore the impact of obliquity variations on planetary habitability in realistic systems with high mutual inclination. We first numerically integrate the orbital evolution with N-body simulations and verify stability on 10^8 year timescales. We then calculate the obliquity variations induced by the orbital architecture on 1 Earth mass (terrestrial) planets at 1 AU around a solar-mass star. Finally, we run energy balance models (EBM) on the terrestrial planets to assess surface temperature, which we assume is a proxy for habitability. We present general trends in obliquity changes and evaluate those changes in terms of habitability. Finally, we explore the limits of the habitable zone for planets with dramatic obliquity variations by changing the terrestrial planet's semi-major axis via EBM calculations for 10^6 years.

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Date submitted: 07 Sep 2010 Electronic form version 1.4