



Magnetic field connection/reconnection between exoplanets and host stars

T.Y. Liu (1), W.H. Ip(2)

(1) Institute of Space Science, National Central University, Taiwan, (2) Institute of Astronomy, National Central University, Taiwan.

That many Jupiter-sized exoplanets have very small orbital distances ($a < 0.05$ AU) to their central host stars has raised the possibility that tidal interaction or electromagnetic coupling (i.e., magnetic field reconnection) could lead to heating of both the stellar atmospheres and the planetary atmospheres. Time-series photometric observations have ruled out tidal effect as an important heat source because of the lack of symmetrical signatures on the stellar spectra as the close-in giant exoplanets orbit around their host stars. The absence of asymmetrical signature and the phase lag in some of the cases studied are equally perplexing. In this work we show how different ways of interconnections of the surface magnetic field of a host star with the magnetosphere of an exoplanet - in some idealized situations - might lead to a variety of possible imprints on the stellar surface. But some cases like Tau Boo which show no sign of energy transfer in spite of the very close orbital distance remain unexplained.