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Close-in gas giant evaporation due to intense XUV radiation

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Astrophysical observations of young stars indicate much larger X-ray and EUV fluxes than stars with the age of our present Sun. Because of this one can expect that during and after giant planet formation the early high radiation flux of a parent star in the short wavelengths will have great impact on atmospheric loss from such a planet . We discuss physical conditions under which hydrodynamic “blow off” can occur and solve the system of hydrodynamic equations for a hydrogen atmosphere to study thermal escape processes from a “Hot Jupiter”. We show that at very high EUV fluxes the incoming stellar energy is converted into kinetic and thermal energy of planetary hydrogen wind, which can significantly erode the planetary atmosphere. Additionally, Roche lobe effects are considered since they can dramatically increase the loss rates from gas giants at very close orbits.