Geophysical Research Abstracts
Vol. 21, EGU2019-5681, 2019
EGU General Assembly 2019

Radio emission of supermassive hot Jupiters and giant free floating planets

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In this study we explore if supermassive hot Jupiters can maintain source regions for radio emission, and if this emission can propagate to an observer outside the system. We study planets like Tau Bootis b (5.84 Jupiter masses and 1.06 Jupiter radii) at different orbital distances (between its real orbit of 0.046 and 0.2 au). The strong gravity of such a planet and efficient radiative cooling keeps the upper atmosphere in an (almost) hydrostatic state and the exobase stays very close to the planet. This makes it a good candidate for observations in the radio range. Conditions are expected to be similar as for Jupiter. Therefore, unlike hot Jupiters with lower mass, like HD 209458b and HD 189733b, supermassive hot Jupiters are expected to be in general better targets for radio observances. Furthermore, we investigate the object SIMP J01365662+0933473, which has recently been detected in the radio range, and is probably the first planetary mass object ever detected in radio. We study the possibility of a large moon or maybe planet in orbit, which would be a plasma source for the generation of the strong radio emission of this free floating planet/brown dwarf.