AGU FALL MEETING
San Francisco | 12–16 December 2016

P33C-2144: The complex behavior of the satellite footprints at Jupiter: the result of universal processes?

Wednesday, 14 December 2016
13:40 - 18:00
Moscone South - Poster Hall

At Jupiter, some auroral emissions are directly related to the electromagnetic interaction between the moons Io, Europa and Ganymede on one hand and the rapidly rotating magnetospheric plasma on the other hand. Out of the three, the Io footprint is the brightest and the most studied. Present in each hemisphere, it is made of at least three different spots and an extended trailing tail. The variability of the brightness of the spots as well as their relative location has been tentatively explained with a combination of Alfvén waves' partial reflections on density gradients and bi-directional electron acceleration at high latitude. Should this scenario be correct, then the other footprints should also show the same behavior.

Here we show that all footprints are, at least occasionally, made of several spots and they all display a tail. We also show that these spots share many characteristics with those of the Io footprint (i.e. some significant variability on timescales of 2-3 minutes). Additionally, we present some Monte-Carlo simulations indicating that the tails are also due to Alfvén waves electron acceleration rather than quasi-static electron acceleration. Even if some details still need clarification, these observations strengthen the scenario proposed for the Io footprint and thus indicate that these processes are universal.

In addition, we will present some early results from Juno-UVS concerning the location and morphology of the footprints during the first low-altitude observations of the polar aurorae. These observations, carried out in previously unexplored longitude ranges, should either confirm or contradict our understanding of the footprints.

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