



Bright spot auroras in Jupiter's polar region: Juno-UVS observations

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In July of 2016, NASA began a new era in Jupiter exploration by placing the Juno spacecraft and its highly capable suite of scientific instrumentation in a polar orbit about Jupiter. It was a unique opportunity to study Jupiter's auroras in great details with the Ultraviolet Spectrograph (UVS) instrument during the first 25 perijoves. Here we present a systematic analysis of a newly identified feature of the polar emissions called the auroral bright spot. The bright spots have power ranging from tens to a hundred gigawatts. In a given perijove, bright spot reoccurs at almost the same system III (SIII) position within a time interval of a few to tens of minutes. Furthermore, we found a brightness quasiperiodicity of 22-28 minutes in the southern bright spots observed during perijove 4 and perijove 16. The northern bright spots locate in a confined region, near 175° SIII longitude and 65 degrees latitude, while the southern spots scatter randomly around the pole. The bright spots' positions reported here are usually located on the edge of the swirl region (the polar-most region of Jupiter's auroras). This feature is observed at all magnetic local times rather than being confined to the noon sector. Therefore, the bright spot is incompatible with the auroral signature of Earth-like Sun-facing cusp, as proposed in earlier works. However, due to Jupiter's rapid rotation with respect to the size of the magnetosphere, the topology of the cusp region at Jupiter is expected to be considerably complicated by the twisting of the field lines. Hence, we cannot conclude whether the bright spot is related to the Jovian cusp processes yet. Finally, we also have identified time intervals during which Juno flew through the field lines connected to the bright spot allowing further investigations of the associated particles and responsible processes.