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Jupiter polar cap high energy particle acceleration observed from Juno

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The Juno mission carries the Advanced Stellar Compass (ASC) as primary attitude reference for the MAG investigation. Since Jupiter Orbit Insertion on July 4, 2016, the ASC has continuously monitored high energy particles fluxes in Jupiter's magnetosphere. In the attitude determination process, the energetic particles with sufficient energy to penetrate the heavily shielded focal plane CCD are detected and characterized to facilitate their removal in the stellar attitude match. Thus highly energetic particles, >15MeV for electrons, >80MeV for protons, and >~GeV for heavier elements, are detected and reported every 250ms. The ASC's highly optimized radiation shield design enables directional sensitivity, since shielding encountered by particles entering via the optics aperture is less efficient. The directionality offers preferential detection to electrons with energies between 15 and 25MeV and protons with energies between 80 and 100MeV (i.e operates as a particle telescope), whereas particles with energies above these limits may penetrate from any direction. The Juno spacecraft, rotates at 2 RPM, thus particles with energies in the band mentioned, and velocities pointing to the lens exhibit particle flux variation with the spin phase of Juno. Every periJove, Juno traverses a section of the north and south polar caps, and now, past the midpoint of nominal mission, high energetic particles in the aurora regions have been mapped with a high degree of detail. A significant feature is that very intense beams of particles are regularly measured at field lines reaching well beyond L=50, i.e. on distant closed or open field lines. These features are rapidly varying, signifying either a very limited extent, or, high time variability. In the cases where these beams contain particles with energies in the directional sensitive range of the ASC, the source of the beam is from the aurora region, suggesting a polar cap mechanism, capable of accelerating a particle directly to 20MeV. We present examples of flux profiles on open field lines.