



Evidence of field-aligned currents in Jupiter's polar magnetosphere

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Jupiter presents the most dramatic and active aurorae in our solar system. Images of intense aurorae have been captured by Juno's ultraviolet and infrared imaging spectrographs. Jupiter's aurorae are huge in size, and hundreds of times more energetic than those on Earth. Therefore, intense field-aligned currents accompanied by large magnetic field perturbations were expected to be found in transit across field lines rooted in the main auroral oval. Juno's vector magnetic field measurements revealed a puzzling situation: Jupiter does not evidence intense field-aligned currents associated with the main aurora. We present observations of magnetic field perturbations due to field-aligned currents. The perturbations are weaker than expected, and unlike Earth, Jupiter's auroral field-aligned currents do not flow in organized regions of clearly defined parallel sheets but show dynamic filamentary structures affected by the co-rotation of the plasma in Jupiter's magnetosphere.