Observations of Pi2 pulsations at substorm onset with the SuperDARN THEMIS mode

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The multi-spacecraft NASA THEMIS mission is focused on resolving the time sequence of events that occur in the magnetotail during the onset of the expansion phase of substorms. The THEMIS mission design also contains a robust ground-based network of magnetometers and all-sky cameras that are being used to identify the onset time and location of auroral disturbance in the ionosphere. In support of THEMIS mission goals, the SuperDARN community has agreed to operate a special camping-beam mode during THEMIS conjunctions over North America to maximize the temporal resolution of SuperDARN radar measurements during THEMIS events. The THEMIS mode provides 8-second resolution on a single designated camping beam while simultaneously marching through each beam of the normal scan. In this presentation, we present SuperDARN and THEMIS measurements during the onset of a substorm on February 22nd. This event clearly demonstrates the gains in temporal resolution that can be achieved using the THEMIS camping-beam mode. The Blackstone radar was able to measure clear Pi2 oscillations on its camping beam that are very consistent with measurements obtained by ground-based magnetometers.