



Remote sensing of a NTC radio source from a Cluster tilted spacecraft pair

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The non-thermal continuum (NTC) radiation is a radio wave produced within the magnetosphere of a planet. It has been observed in space around Earth since the '70s, and within the magnetospheres of other planets since the late '80s. A new study using ESA's Cluster mission has shown improved precision in determining the source of various radio emissions produced by the Earth. The experiment involved tilting one of the four identical Cluster spacecraft to measure the electric field of this emission in three dimensions for the first time. Our analysis of a NTC case event pinpointed a small deviation from the generally assumed (circular) polarization of this emission. We show that classical triangulation, in this case using three of the spacecraft located thousands of kilometres apart, can lead to an erroneous source location. A second method, using the new 3D electric field measurements, indicated a source located along the plasmopause at medium geomagnetic latitude, far away from the source location estimated by triangulation. Cluster observations reveal that this NTC source emits from the flank of the plasmopause towards the polar cap. Understanding the source of NTC waves will help with the broader understanding of their generation, amplification, and propagation.