



Multispacecraft observations of quasi-periodic emissions

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Quasi-periodic (QP) emissions are VLF electromagnetic waves in the frequency range of about 0.5–5 kHz which exhibit a periodic time modulation of the wave intensity. The modulation period is usually on the order of a few tens of seconds. The generation mechanism of these emissions is still not understood, but at least in some cases it appears to be related to ULF magnetic field pulsations which result in periodic modifications of the resonant conditions in the source region. We use multipoint measurements of QP emissions by the 4 Cluster spacecraft. The observations are obtained close to the equatorial region at radial distances of about 4 Earth radii, i.e. close to a possible generation region. A combined analysis of the high resolution data obtained by the WBD instruments and the ULF magnetic field data obtained by the FGM instruments allows for a detailed case-study analysis of these unique emissions. The presented analysis benefits from the recent close-separation configuration of three of the Cluster spacecraft (≈ 20 –100 km) and a related timing analysis, which would be impossible otherwise.