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Conjugate observations of a remarkable quasiperiodic event by the low-altitude DEMETER spacecraft and ground-based instruments

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Quasiperiodic (QP) events are electromagnetic waves observed in the inner magnetosphere at frequencies between about 0.5 and 4 kHz that exhibit a nearly periodic modulation of the wave intensity. The modulation periods may range from tens of seconds up to minutes. We present a detailed multipoint analysis of a remarkable QP event observed consecutively for several hours on 26 February 2008. The event was detected by ground-based instruments of Sodankyla Geophysical Observatory (Finland) and by the low-altitude DEMETER spacecraft, both in the same and conjugate hemispheres. The time intervals when the event was observed on board the satellite/on the ground provide us with an estimate of the event dimensions. When the event is detected simultaneously by the satellite and on the ground, its observed frequency-time structure is generally the same. However, the ratio of detected intensities varies significantly as a function of the spacecraft latitude. Moreover, there is a delay as large as about 10 s between the times when individual QP elements are detected by the spacecraft/on the ground. This appears to be related to the azimuthal separation of the instruments, and it is highly relevant to the identification of a possible source mechanism. Finally, we find that the intensity of the QP event is correlated with the amplitude of Alfvenic ULF pulsations measured on the ground.