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► To cite this version:

Barbora Bezdekova, Frantisek Nemecek, Jyrki Manninen, Michel Parrot, Ondrej Santolik, et al.. Conjugate observations of a remarkable quasiperiodic event by the low-altitude DEMETER spacecraft and ground-based instruments. EGU General Assembly 2016, Apr 2016, Vienne, Austria. insu-03573538

HAL Id: insu-03573538

<https://insu.hal.science/insu-03573538>

Submitted on 15 Feb 2022

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

Barbora Bezdekova (1), Frantisek Nemecek (1), Jyrki Manninen (2), Michel Parrot (3), Ondrej Santolik (4,1), and Mykhaylo Hayosh (4)

(1) Faculty of Mathematics and Physics, Charles University in Prague, Prague, Czech Republic, (2) Sodankyla Geophysical Observatory, Sodankyla, Finland, (3) LPC2E/CNRS, Orleans, France, (4) Institute of Atmospheric Physics, Czech Academy of Sciences, Prague, Czech Republic

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 Alfvénic ULF pulsations measured on the ground.