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Seismic characterization of Virgo: space-time spectral analysis

Mixed space-time spectral analysis was applied for the detection of seismic waves passing through the west-end building of the Virgo interferometer. The method enables detection of every single passing wave, including its frequency, length, direction, and amplitude. A thorough analysis aimed to improving sensitivity of the Virgo detector was made for the data gathered by 38 seismic sensors, in the two-week measurement period, from 24 January to 6 February 2018, and for frequency range 5–20 Hz. Two dominant seismic-wave frequencies were found: 5.5 Hz and 17.1 Hz. The possible sources of these waves were identified, that is, the nearby industrial complex for the frequency 5.5 Hz and a small object 100 m away from the west-end buiding for 17.1 Hz. The obtained results are going to be used to provide better estimation of the newtonian noise near the Virgo interferometer.

Auteur principal: Dr DENYS, Mateusz (AstroCeNT, Nicolaus Copernicus Astronomical Center, Polish Academy of Sciences)

Co-auteurs: Prof. BULIK, Tomasz (AstroCeNT, Nicolaus Copernicus Astronomical Center, Polish Academy of Sciences); SZYMKO, Robert (Faculty of Physics, University of Warsaw)

Orateur: Dr DENYS, Mateusz (AstroCeNT, Nicolaus Copernicus Astronomical Center, Polish Academy of Sciences)