



The GINGERino ring laser gyroscope, seismological observations at one year from the first light

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Abstract

The GINGERino ring laser gyroscope (RLG) is a new large observatory-class RLG located in Gran Sasso underground laboratory (LNGS), one national laboratory of the INFN (Istituto Nazionale di Fisica Nucleare). The GINGERino apparatus funded by INFN in the context of a larger project of fundamental physics is intended as a pathfinder instrument to reach the high sensitivity needed to observe general relativity effects; more details are found at the URL (<https://web2.infn.it/GINGER/index.php/it/>). The sensitivity reached by our instrument in the first year after the set up permitted us to acquire important seismological data of ground rotations during the transit of seismic waves generated by seisms at different epicentral distances. RLGs are in fact the best sensors for capturing the rotational motions associated with the transit of seismic waves, thanks to the optical measurement principle, these instruments are in fact insensitive to translations. Ground translations are recorded by two seismometers: a Nanometrics Trillium 240 s and Guralp CMG 3T 360 s, the first instrument is part of the national earthquake monitoring program of the Istituto Nazionale di Geofisica e Vulcanologia (INGV) and provides the ground translation data to be compared to the RLG rotational data. We report the waveforms and the seismological analysis of some seismic events recorded during our first year of activity inside the LNGS laboratory.