EGU2020-21959
https://doi.org/10.5194/egusphere-egu2020-21959
EGU General Assembly 2020

GINGERINO and the GINGER Project

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GINGER (Gyroscopes IN General Relativity) is a proposal aiming at measuring the Lense-Thirring effect with an experiment based on Earth. It is based on an array of ring lasers, at present the most sensitive inertial sensors to measure the rotation rate of the Earth.

Rotation and angular measurements are of great importance for various fields of science: General Relativity predicts rotation terms originated from the kinetic term, Earth Science studies the Earth's angular velocity with its variations, the tides and related perturbations, the normal modes of the Earth, the angular perturbations associated to the movement of the plates, the deformations of hydrological nature, without neglecting the rotational signals produced by the earthquakes. A ring laser integral to the Earth's surface is sensitive not only to the angular rotation of the planet, but also to global and local rotational signals. For this reason GINGER is relevant for geophysics.

GINGERINO is a ring laser prototype installed inside the underground laboratory of the Gran Sasso. Its typical sensitivity is well below 0.1 nrad/s in 1 second measurement, and it is acquiring data on a continuous basis since several years. The most recent data of GINGERINO and the results relevant for geoscience are discussed.