

GINGER

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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 an array of ring lasers, which are the most sensitive inertial sensors to measure the rotation rate of the Earth. This experiment is Earth based, it is well known that Lense Thirring measurements are currently done with space experiment, but the earth based one provides the measurement at a certain latitude and the map of the gravity field is unnecessary. The interdisciplinary nature of this experiment is outlined, with particular attention to the dark matter search.

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 and all 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 all the global and local rotational signals to which it is subjected. For this reason GINGER is relevant for geophysics.

GINGERINO is a ring laser prototype installed inside the underground laboratory of the Gran Sasso, it has been built in order to validate the laboratory for GINGER. Its typical sensitivity is below 0.1 nrad/s in 1 second measurement. GINGERINO has validated LNGS for GINGER and it is now used for geophysical measurements. It is taking data since May 3 2017, typical data will be shown.

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