Contribution ID: **32** Type: **not specified**

An experiment to measure the speed of gravity: optimization of the rotating quadrupole mass

Wednesday, 12 December 2018 15:30 (10 minutes)

The authors have experience with the SCHENBERG Gravitation Wave detector which is a resonant-mass developed by the Brazilian GRAVITON. Its spherical antenna weighs 1150 kg and it is monitored by six ultralow noise parametric transducers and is connected to the outer environment by a suspension system designed to attenuate local noise, both seismic and non-seismic, operating in a temperature of 4 K. With all the acknowledgment acquired the idea of making an experiment to measure the speed of gravity took form. Using monocrystalline sapphire with very high mechanical and electrical Q´s, ultralow phase noise microwave sources, Finite Element Modelling designed suspensions, parametric microwave transducers, excellent properties of noise filtering of the resonant-mass detectors and the development of high-speed rotation machines guided the authors to the design of the experiment. The experiment will measure oscillations caused by gravitational interaction with an amplitude of the order of 0.1 am (10-19m). The main feature is a rotating mass that will generate a periodic tide signal at a very high frequency. in this work the optimization of such mass to reach the highest tide signal is shown.

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