SRF2025 TOKYO

22ND INTERNATIONAL CONFERENCE ON RF SUPERCONDUCTIVITY

September 21-26, 2025

Contribution ID: **67** Contribution code: **TUP78** Type: **Student Poster Presentation**

# Coming closer to high frequency gravitational waves detection with MAGO

*Tuesday 23 September 2025 14:30 (3 hours)*

In the last years, low frequency gravitational waves (GWs) have been consistently measured by the LIGO-Virgo collaboration, but little to no attention has been paid to higher frequencies GWs in the range of 10 kHz to 100 MHz, at which confirmation for current theories or even new physics could be hidden. The MAGO 2.0 project aims at filling this gap in the parameters space using superconducting radio-frequency (SRF) cavities. Exploiting the excellent Q-factors of these resonators, we plan to detect tiny harmonic deformations induced by GWs which change the boundary conditions of the oscillating electromagnetic field. We present the results of the first cold tests ran at DESY and FNAL using the cavity prototype built 20 years ago at the end of the MAGO collaboration, characterizing the RF spectrum, Q-factor and surface resistance. In particular we present the mechanical vibration spectrum characterization and the RF response of the cavity with the injection of a "fake GW"signal using piezoelectric actuators.

## I have read and accept the Privacy Policy Statement

Yes

## Footnotes

## Funding Agency

**Author:** MARCONATO, Giovanni (Università degli Studi di Padova)

**Co-authors:** Dr MELNYCHUK, Alex (Fermi National Accelerator Laboratory); Dr NETEPENKO, Alex (Fermi National Accelerator Laboratory); Dr MUHS, Andrea (Deutsches Elektronen-Synchrotron DESY); GRASSELLINO, Anna (Fermi National Accelerator Laboratory); GIACCONE, Bianca (Fermi National Accelerator Laboratory); Prof. MOORTGAT-PICK, Gudrid (Universität Hamburg); GONIN, Ivan (Fermi National Accelerator Laboratory); BRANLARD, Julien (Deutsches Elektronen-Synchrotron DESY); Dr PETERS, Krisztian (Deutsches Elektronen-Synchrotron DESY); Mr FISCHER, Lars (Universität Hamburg); Dr BUTKOWSKI, Lukasz (Deutsches Elektronen-Synchrotron DESY); WENSKAT, Marc (Deutsches Elektronen-Synchrotron DESY; Universität Hamburg); Dr HIERHOLZER, Martin (Deutsches Elektronen-Synchrotron DESY); Dr HOFFMANN, Matthias (Deutsches Elektronen-Synchrotron DESY); Dr EBERENZ, Mona (Deutsches Elektronen-Synchrotron DESY); Dr PRONITCHEV, Oleg (Fermi National Accelerator Laboratory); POSEN, Sam (Fermi National Accelerator Laboratory); KHABIBOULLINE, Timergali (Fermi National Accelerator Laboratory); Mr KROKOTSCH, Tom (Universität Hamburg); CHOUHAN, Vijay (Fermi National Accelerator Laboratory); Prof. HILLERT, Wolfgang (Universität Hamburg); Dr ORLOV, Yuriy (Fermi National Accelerator Laboratory)

**Presenter:** MARCONATO, Giovanni (Università degli Studi di Padova)

**Session Classification:** Tuesday Poster Session

**Track Classification:** MC5: SRF Applications