



Contribution ID: 174

Type: **Talk in the parallel session**

A cryogenic & superconducting inertial sensor for the Lunar Gravitational Wave Antenna and for... selenophysics

Wednesday, 7 July 2021 07:55 (15 minutes)

The Lunar Gravitational-Wave Antenna (LGWA) is a proposed low-frequency gravitational-wave detector on the Moon's surface.

Its core will be composed of an array of high-end seismic sensors: CSIS (Cryogenic Superconducting Inertial Sensor).

A cryogenic environment will be used in combination with superconducting materials to open up pathways to low-loss actuators and sensor mechanics.

CSIS revolutionizes the (cryogenic) inertial sensor field by obtaining a displacement sensitivity at 0.5 Hz of 3 orders of magnitude better than current state-of-art. It will allow LGWA to be sensitive below 1 Hz, down to 1 mHz and It will also be employed in the forthcoming Einstein Telescope (ET) - a third-generation gravitational-wave detector which will make use of cryogenic technologies and that will have an enhanced sensitivity below 10 Hz. Moreover, CSIS seismic data could also be employed to get new insights about the Moon's interior... and the selenophysics (the Moon's geophysics).

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Session Classification: Mid-Frequency Gravitational Waves (0.1-10 Hz): Sources and Detection Methods

Track Classification: Gravitational Waves: Mid-frequency Gravitational Waves (0.1-10 Hz): Sources and Detection Methods