

Session ID: GEO-4

Title

INNOVATIVE GROUND INTERFACE CONCEPTS BASED ON SEISMIC METAMATERIALS FOR STRUCTURE PROTECTION

Convenors

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Description

This session aims to present and discuss recent technological developments and research findings, indicating that seismic metamaterials have the potential to greatly contribute to the new development of the seismic protection technology field, providing targeted and cost-effective solutions for seismic isolation and vibration control of structures and infrastructure.

Seismic metamaterials are structures, or systems of structures, engineered to control or manipulate seismic waves. Their design is based on the ability of arrays of periodically repeated unit blocks to interact, control, and as much as possible inhibit the propagation of seismic waves. The outstanding properties of seismic metamaterials have been explored by a recent European research and innovation project, ITN-INSPIRE, investigating a variety of possible applications, such as:

- Layouts of pile groups and foundation unit blocks installed in the soil to trap or redirect seismic waves and limit free-field motion.
- Resonant (meta)barriers, consisting of cells with an internal vibrating mass, are embedded in the perimeter of a structure to isolate it from seismic actions.
- Elastic cloaks (metasurfaces) for mitigation of surface waves (Love and Rayleigh waves).
- Vibration control devices employing negative stiffness elements and directional inertial amplifiers for seismic retrofitting of structures.
- Passive mechanical systems encompassing multistable behaviour, with possible applications in the field of force-limiters and soft mechanisms.

We welcome the submission of theoretical, numerical and experimental studies investigating the underlying physics of seismic metamaterials and demonstrating their potential application for the seismic protection of the built environment.

Invited Speakers

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