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How can seismological observations inform us about physical processes across the scales?

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The ambient seismic wave field carries information about the sources that excited it, and about the material that it passed through. By recording and carefully analyzing the seismic 'background noise', we can learn many things about physical processes on Earth and beyond.

For example, the most prominent seismic noise comes from interactions between ocean waves and the solid Earth. Therefore, it carries the imprint of storms, of weather over the oceans and seas, and even of the tides.

The seismic noise field also carries the imprint of structures it has passed through, and changes therein. I will show that useful signals can be extracted from ambient noise, which can then be used to monitor material changes with high temporal resolution.

Thanks to recent sensor developments, we can use telecommunication fiber for seismo-acoustic measurements with unprecedented spatial and temporal resolution. This type of measurement offers high potential for seismic measurements to support high precision physical experiments, accelerators, and gravitational wave detectors.

Over the past decade, the use of seismic noise has found its way into applications across temporal and spatial scales. I will give an overview of current applications as well as a quick peek into future developments.

Category

Geophysics

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