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## S008-05 - Ambient seismic noise interferometry using rotational ground motion (Invited)

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 13:18 - 13:22

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## Abstract

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In seismology, new sensing technologies are currently emerging that can measure ground motion beyond the conventional seismic translation measurements. In particular, rotational motion sensors record an additional 3 components of ground motion and thus provide access to additional information about the seismic wavefield. So far, most studies of rotational ground motion are mainly based on recordings of earthquakes or active sources. In this study, we push the limit towards the very weak motions associated with ocean-generated ambient seismic noise. Our aim is to show the potential of using these measurements in the context of ambient noise interferometry.

We use recordings from two ring lasers in Germany: the `G-Ring' at the Wettzell Geodetic Observatory, and `ROMY' at the Fürstenfeldbruck Observatory near Munich, at a distance of approximately 160 km. These are the most sensitive instruments to date which offer a local, direct measurement of rotational ground motion.

We demonstrate that the sensitivity of the Wettzell instrument has been sufficiently improved to detect Love waves in the primary microseismic frequency band. Both the G-Ring and ROMY ring lasers are also capable of detecting Love waves in the stronger secondary microseismic band. This latter frequency range is used to test the possibility of performing noise interferometry with rotational records. The first results of rotational noise interferometry between the two ring lasers are promising. The correlation waveform is verified by comparison with interferometry carried out with co-located seismometer data at both locations, as well as with numerical simulations. In conclusion, we show that ambient noise interferometry is in principle feasible using real rotational recordings of ocean-generated noise. This proof of concept study forms a first step towards noise interferometry of 6-component displacement data.

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