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[415] Exploiting frequency metrology fiber networks for earthquake sensing

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Beyond their main purpose of state-of-the-art frequency dissemination for atomic physics, phase-stabilized fiber-optic networks promise versatile applications as environmental sensors, in particular for seismology. Here we present how such a fiber network can be exploited as an earthquake sensor. We analyze the phase correction signal on a 126 km long fiber leg connecting METAS in Bern to the University of Basel during an M3.9 earthquake in the Mulhouse region. Further, we model the propagation of the seismic waves and simulate their impact onto the fiber, finding a quantitative match between observation and simulation. This validates our system as a quantitative seismic sensor and opens up possibilities for fiber-based earthquake sensing.

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