Fractional white-noise limit and paraxial approximation for waves in random media
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In this talk we will discuss the asymptotic analysis of high frequency wave propagation in random media with long-range dependence. We present two asymptotic regimes that we investigate simultaneously: the paraxial approximation, where the wave is collimated and propagates along a privileged direction of propagation, and the white-noise limit, where random fluctuations in the background are well approximated in a statistical sense by a fractional white noise. The fractional nature of the fluctuations is reminiscent of the long-range correlations in the underlying random medium. Starting from the high frequency wave equation with fast non-Gaussian random oscillations in the velocity field, we derive the fractional Itô-Schrödinger equation, that is a stochastic Schrödinger equation with a potential given by a fractional white noise.