Title: Multiscale method for the nonlinear Helmholtz equation

Abstract: In this talk, we discuss numerical methods for the nonlinear Helmholtz equation, which aims to model time-harmonic wave propagation in nonlinear media. We first review common finite element approaches for this problem. However, when the material additionally features finescale structures, such direct numerical schemes have a high computational complexity. Therefore, we will discuss multiscale methods as a remedy, where the approximation spaces are problem adapted. A special focus lies on how to tackle the nonlinearity in the approach. We present rigorous a priori error analysis as well as illustrating numerical examples.