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**Hongyu Liu\*** (hliu28@unc.edu), Department of Mathematics and Statistics, University of North Carolina, Charlotte, NC 28263. *Enhance Approximate Cloaking by SH and FSH Lining.*

In this talk, we shall report our recent study on approximate cloaking from a regularization viewpoint for the Helmholtz equation. We shall show that by employing a sound-hard (SH) layer between the cloaked region and the cloaking region, one could achieve a near-cloaking construction within  $\rho^N$  of the ideal cloaking, where  $\rho$  is the regularization parameter and  $N$  is the space dimension. This significantly improves the known results in literature, where one could only achieve  $|\ln \rho|^{-1}$  in 2D and  $\rho$  in 3D. We then develop a special lossy layer which can be taken as a finite realization of the sound-hard lining and called a FSH construction. The FSH construction is shown to possess the same near-cloaking performance as the SH one. Both theoretical and numerical results shall be presented. (Received August 28, 2011)