Sparsity-based techniques for solving the inverse scattering problem

Michael Unser
École polytechnique fédérale de Lausanne, Biomedical Imaging Group

Inverse-scattering is a challenging problem encountered in many fields such as coherent microscopy. While classical reconstruction methods were relying on linear approximation of the forward model, recent works have shown the benefit of combining advances physics (nonlinear models) and sparsity. In this talk, we present a reconstruction algorithm that deploys the nonlinear Lippmann-Schwinger model together with sparsity-based regularizations. Then, we show the ability of the method to provide high-quality reconstructions for difficult configurations in coherent light microscopy (high contrasts, few illuminations).