Phase Retrieval By Projections

Pete Casazza (MU, Math)

Abstract

Phaseless reconstruction has broad application to x-ray crystallography, electron microscopy, diffractive imaging, x-ray tomography and more. The mathematics of phase retrieval is a very active area of research at this time. Recently, in several areas of research such as crystal twinning, it has become necessary to do phase less reconstruction from the norms of the projections of a signal onto subspaces. It was believed that norms of projections give much less information than inner products with vectors and so we would need many more projections to do phaseless than we can do with vectors. We will look at recent results on this problem which include the surprising results that we can do phaseless reconstruction with the same number of projections as we can do it with vectors. This now reverses the above problem to: Is it possible to do phaseless with fewer projections than we can do it with vectors?