

The Geometry of the Phase Retrieval Problem

Abstract:

Phase retrieval is a problem that arises in a wide range of imaging applications, including x-ray crystallography, x-ray diffraction imaging and ptychography. The data in the phase retrieval problem are samples of the modulus of the Fourier transform of an unknown function. To reconstruct this function one must use auxiliary information to determine the unmeasured Fourier transform phases. There are many algorithms to accomplish task, but none work very well. In this talk we present an analysis of the geometry that underlies these failures and points to new approaches for solving this class of problems.