1100-46-20 **Peter G. Casazza*** (`casazzap@missouri.edu`), Department of Mathematics, University of Missouri, Columbia, MO 65211. *Phase Retrieval By Projections.*

Phase retrieval is critical for a number of areas of engineering including: electron microscopy, diffractive imaging, x-ray tomography, optics, inline phase contrast x-ray imaging and much more. In some applications, such as x-ray crystallography, a problem arises with crystal twinning and more which makes it necessary to retrieve phase from projections onto subspaces. We will present the mathematical solution to this problem showing that phase can be retrieved with a very small number of arbitrary dimensional subspaces. We will give a number of related results some of which are quite surprising, (Received January 11, 2014)