1037-94-248 **Larry A Gratton*** (grattonl@berea.edu), CPO 1934, Berea, KY 40404. *Sampling Functions with Symmetry: Applications to Computed Tomography.* Preliminary report.

As every College Algebra student learns, when a function possesses symmetry, its graph may be constructed from half the usual number of data. While this may be obvious for simple odd or even functions, it is not so straight-forward in general. Classical sampling theory entails the reconstruction of a bandlimited function from its samples measured on a regular discrete set, or lattice. Employing the symmetry property of a function generally leads to nonuniform sampling sets, and it is not immediately clear what additional information may be recovered from the resulting data.

In this paper, we characterize the sets obtained by exploiting the symmetry of a sampled function and present a general reconstruction formula based on the theory of nonuniform sampling on unions of shifted lattices. We discuss conditions for stable reconstruction and utilizing symmetry to overcoming the effects of undersampling on a single sparse lattice. Applications to 2-D and 3-D helical computed tomography are presented. (Received February 04, 2008)