

Meeting: 1003, Atlanta, Georgia, SS 5A, AMS Special Session on Radon Transform and Inverse Problems, I

1003-44-1077 **Patrick J. La Riviere*** (pjlarivi@midway.uchicago.edu), Department of Radiology, The University of Chicago, 5841 S. Maryland Ave., MC-2026, Chicago, IL 60637. *Sampling issues and challenges in single- and multi-slice helical CT*. Preliminary report.

The sampling and aliasing properties of the 2D Radon transform have been well characterized in both parallel- and fan-beam geometries, and this understanding has helped inform system design in computed tomography (CT). However, the introduction of helical scanning modes and the transition from single-slice to multi-slice scanners in recent years have given rise to new sampling patterns that have not yet been analyzed fully. In this work, we will highlight some of the practical sampling questions introduced by the new scanners and discuss some of the mathematical tools that have been used to illuminate these questions, including multidimensional sampling analysis and Fourier crosstalk analysis. We will consider the question of whether the use of quarter-detector offset, often used in step-and-shoot CT to increase radial sampling, is still advantageous in helical CT. We will also consider whether in multi-slice scanners, certain helical pitches lead to more optimal sampling patterns than others and, in that context, we will discuss the general challenges of analyzing sampling and aliasing effects in multi-slice CT. (Received October 03, 2004)