1056-92-491   **Eric Todd Quinto*** (`todd.quinto@tufts.edu`), Department of Mathematics, Tufts University, 503 Boston Ave., Medford, MA 02155, and **Hans Rullgard** (`hansr@math.su.se`), Department of Mathematics, University of Stockholm, Stockholm, Sweden. *Local Singularity Reconstruction from Integrals over Curves in $\mathbb{R}^3$ and electron microscopy.* Preliminary report.

We define a general curvilinear Radon transform in $\mathbb{R}^3$, and we develop the microlocal properties of this transform. Singularities can be added in any backprojection reconstruction method for this transform. We use the microlocal properties to develop a local backprojection reconstruction algorithm that decreases the effect of the added singularities and reconstructs boundaries and contours of the object. This work is motivated by new models in electron microscope tomography in which the electrons travel over curves such as helices or spirals. We provide reconstructions for a specific transform motivated by this electron tomography problem. (Received September 09, 2009)