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James Webber and **Eric Todd Quinto*** (todd.quinto@tufts.edu), Department of Mathematics, Tufts University, 503 Boston Ave., Medford, MA 02155. *Microlocal analysis of generalized Radon transforms from scattering tomography.*

We present a novel microlocal analysis of generalized Radon transforms which describe the integrals of L^2 functions of compact support over surfaces of revolution of C^∞ curves q in \mathbb{R}^n . We show that the Radon transforms are elliptic Fourier Integral Operators (FIO) and provide an analysis of the left projections Π_L . Our main theorem shows that Π_L satisfies the semi-global Bolker Assumption if and only if $g = q'/q$ is an immersion. An analysis of the visible singularities is presented, after which we derive novel Sobolev smoothness estimates for the generalized Radon FIO. Our theory has specific applications in Emission Compton Scattering Tomography (ECST) and Bragg Scattering Tomography (BST). We show that the ECST and BST integration curves satisfy the semi-global Bolker Assumption and provide simulated reconstructions from ECST and BST data. Additionally we give example “sinusoidal” integration curves which do not satisfy Bolker and provide simulations of the image artifacts. The observed artifacts in reconstruction are shown to align exactly with our predictions. (Received August 02, 2021)