

Recovery of singularities for several integral transforms arising in medical imaging

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Abstract: An important inverse problem arising in medical imaging is to reconstruct an unknown density function from its integral transform. In this talk, we consider this problem from the perspective of microlocal analysis. The microlocal singularities of the density function provides information about the “jumps” of the density. We will talk about the recovery of microlocal singularities for the integral transform over a family of broken rays, the integral transform over a generic family of smooth curves, and the weighted cone transform arising in Compton camera imaging. The microlocal properties of these transforms and the normal operators are analyzed. We show the lack of the microlocal stability in the first two transforms due to the existence of conjugate points.