RALUCA FELEA, Rochester Institute of Technology
Microlocal analysis of the dense array borehole seismic data

In the seismic scattering problems, acoustic waves are generated at the surface, they scatter off the features in the subsurface, and return to the surface to be detected by receivers. In the dense array borehole seismic inverse problems, the sources are located on the surface and the receivers are located in a borehole. We will describe the microlocal properties of the forward operator F, which maps the image to the data, in the presence of fold caustics. We will show that F is a Fourier Integral Operator with singularities like submersions with folds and cross caps. To find the image, one studies the normal operator F^*F, and in this case, F^*F is a paired Lagrangian operator ($I^{p,l}(\Delta, C)$) which will produce artifacts. We will describe these artifacts and find their strength.