1014-35-756   **Yongzhi Steve Xu*** (`ysxu0001@louisville.edu`), Department of Mathematics, University of Louisville, Louisville, KY 40292. *Methods of inverse scattering/time reversal of sound waves through waveguide from perturbed partial-open space.* Preliminary report.

Recently I have been considering inverse scattering problems of sound waves through a waveguide from partial-open space. A set of sound waveguides connects a base platform to an underwater vehicle near the searching region. Incident sound waves (continuous waves or pulses) are sent in through a waveguide. The incident waves are scattered by the unknown object, and the scattered waves go through the waveguide array and measured at the end of the waveguide. The data are processed to determine the object. Mathematically, this is an inverse problem for sound waves through waveguide from a partial-open medium with unknown object. In this talk we will consider the case that an incident wave u^i is sent in through waveguide G, scattered by the unknown object Ω in the partial-open space, and the scattered wave u^s propagates through the same waveguide G. Mathematical consideration and numerical examples will be presented on determination of the unknown object Ω for given u^i and measured u^s. (Received September 23, 2005)