# Inverse Boundary Value Problems for the Transport Equation and Applications

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The kinetics of particles inside an absorbing and scattering medium is modelled by the Boltzmann equation. In some cases (e.g. photons inside a human tissue or neutrons inside a nuclear reaction) the tiny particles do not interact to each other but rather with the medium. This phenomenon is represented by the linearized Boltzmann also known as the transport equation.

In an inverse boundary problem, we are interested in determining the characteristics of the medium (absorption, scattering) or the sources inside from boundary measurements of the flux of particles coming out. Physically, these problems are of interest in medical imaging: X-rays and optical tomography. Mathematically, these problems are related to questions in integral geometry (reconstruction of functions from its integrals on sub-manifolds), complex analysis (pseudo-analytic functions), or scattering theory (Riemann-Hilbert type problems).

I will present some of the recent results and the techniques used in such problems.