

Some inverse problems in cosmology

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Cosmic microwave background is the thermal radiation remnant from the Big Bang and is a primary source of information regarding the early universe. An outstanding question is what information can be inferred from it. In this talk, we discuss some determination results for metric perturbations of scalar type. Mathematically, we study an inverse source problem for the Boltzmann equation. We prove that the source term which is connected to the metric perturbation can be stably determined for generic absorption coefficients and scattering kernels. Our analysis relies on the microlocal properties of the light ray transform, and its interplay with hyperbolic equations.