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**Jianliang Qian\***, Department of Mathematics, Michigan State University, East Lansing, MI 48823. *Adjoint State Method for the Identification Problem in SPECT.*

Motivated by recent theoretical results obtained by the third author for the identification problem arising in single-photon emission computerized tomography (SPECT), we propose an adjoint state method for recovering both the source and the attenuation in the attenuated X-ray transform. Our starting point is the transport-equation characterization of the attenuated X-ray transform, and we apply efficient fast sweeping methods to solve static transport equations and adjoint state equations. Numerous examples are presented to demonstrate various features of the identification problem, such as uniqueness and nonuniqueness, stability and instability, and recovery of the wave front set. (Received January 16, 2015)