1098-65-291 **Fan Zhao**, Philadelphia, PA 19104, **John C Schotland**, Ann Arbor, MI 48109, and **Vadim A Markel*** (vmarkel@mail.med.upenn.edu), Philadelphia, PA 19104. *Inversion of the Star Transform.*

I will discuss inversion of a generalization of the broken-ray transform, which we refer to as the star transform. The star transform is of the form

$$\Phi_K(\mathbf{R}) = \sum_{k=1}^{K} s_k I_k(\mathbf{R}) \ , \quad \mathbf{R} \equiv (Y, Z) \in \bar{\mathbb{S}} = \{0 \le z \le L\} \tag{1}$$

$$I_k(\mathbf{R}) = \int_0^{\ell_k(Z)} \mu\left(\mathbf{R} + \hat{\mathbf{u}}_k \ell\right) d\ell \ . \tag{2}$$

Here $\mathbf{R}$ is the vertex of the star and $\Phi_K(\mathbf{R})$ is the data function for a K-ray imaging geometry, $\hat{\mathbf{u}}_k = (u_{ky}, u_{kz})$ is a set of K unit vectors with nonzero projections onto the Z-axis (that is, $u_{ky}^2 + u_{kz}^2 = 1$ and $u_{kz} \neq 0$), $\ell_k(Z)$ is the distance (defined for each ray) from the vertex to the boundary, finally, $s_k \neq 0$ is a set of known coefficients.

I will explain how the star transform can be obtained from physical measurements, discuss computationally-efficient methods for its inversion and analyze stability. (Received January 28, 2014)