1137-41-164 **Demetrio Labate*** (dlabate@math.uh.edu), Department of Mathematics, University of Houston, 651 Phillip G Hoffman, Houston, TX 77204-3008, and **Bernhard G Bodmann** and **Bart Goossens**. *Robust and stable region-of-interest tomography by sparsity inducing convex optimization.*

Region-of-interest (ROI) tomographic reconstruction is a challenging mathematical and computational problem, especially in the situation of noisy projection data. Under the assumption of a robust width prior that generalizes sparsity norms and measurement models used in compressed sensing, we derive performance guarantees for ROI tomographic reconstruction by establishing error bounds for stable recovery. The presence of noise motivates relaxing data fidelity and data consistency requirements of computed tomography. Based on these observations, we define an iterative reconstruction algorithm from ROI-focused projection data that is based on convex optimization and approximately minimizes a ridgelet-based sparsity norm within a finite number of steps. Under the robust width assumption, the result of the algorithm is guaranteed to satisfy predetermined fidelity and consistency tolerances while controlling the reconstruction error. We numerically verify the assumptions on the sparsity norm and the measurement geometry by estimating the robust width parameters. Extensive numerical tests using experimental data show that our algorithm performs very competitively with respect to state-of-the-art methods especially for small ROI radii. (Received February 02, 2018)