Bayesian Multiresolution Method for Local Tomography

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In local tomography, the aim is to reconstruct a region of interest (ROI) inside the body using truncated projection data. Image reconstruction from the local tomography data is an ill-posed inverse problem. In this talk, a multiresolution method is presented for local tomography reconstruction. Tissues are represented in a wavelet basis, and regularization is introduced in terms of a Besov norm penalty. The number of unknowns in the reconstruction problem is reduced by abandoning fine-scale wavelets outside the ROI. Compared to traditional voxel-based models, this multiresolution approach allows significant reduction of degrees of freedom without loss of accuracy inside the ROI, as shown by 2D examples using simulated and in vitro local tomography data.