

## Joint inversion and inpainting for limited angle tomography

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**Abstract:** X-ray computed tomography (CT) plays a very important role in daily biomedical practice for diagnosis and therapy, and in materials science for accurate data analysis and quality control. Besides accurate and robust image reconstruction, there is a growing interest in methods for limited angle tomography. The idea is to reduce the X-ray dose delivered to patients or to cope with physical angle limitations in materials science via a significant subsampling of projection data.

Many of such transmission imaging system are based on the Radon transform as the underlying imaging operator. Reconstruction methods can suffer from severe artefacts if the underlying noise, the experimental design, e.g. sparse- or limited-angle sampling, or prior information on measurements or reconstructions are not taken into account sufficiently.

In this talk we present a novel variational method for joint image reconstruction and directional total variation based sinogram inpainting to address the problem of limited angle tomography. Besides the use of anisotropy for inpainting, our main novelty lies in the study of joint sinogram inpainting and reconstruction in one framework, where various numerical results support our findings. This is joint work with M. Benning, C. Brune and R. Lagerwerf.