1096-62-239 **Marylesa Howard*** (howardmm@nv.doe.gov), **Michael Fowler** and **Aaron Luttman**.

Bayesian Abel Inversion with MCMC Sampling in Quantitative X-ray Radiography.

A common image formation process in X-ray radiography is to have a pulsed power source that emits X-rays which are, in turn, absorbed by a scintillator. The scintillator visibly fluoresces in response to the absorbed photons and a CCD camera images the visible light emitted. In this framework, given a radially symmetric object, the intensity image can be interpreted as an Abel transform of the function representing density along the lines of the sight in the scene. We present a Markov Chain Monte Carlo approach for solving the Abel inversion, resulting in a posterior distribution from which the Abel-inverted image can be sampled. We take the image solution to be the mean of the posterior distribution and use the variance of the posterior as a measure of the uncertainty in the reconstruction. Furthermore, we determine uncertainty in the prior precision matrix as well. Results on both 1D and 2D, synthetic and real images from a high energy X-ray source will be presented.

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