AbstractID: 11854 Title: Scatter correction in quantitative dual energy mammography

Purpose: To investigate the performance of a new algorithm designed to correct x-ray scatter and estimate the primary intensity in mammography.

Method and Materials: The algorithm is based on image convolution and implements a spatially variant scatter point spread function which is energy and thickness dependent. The scatter kernel was characterized in terms of its scattering fraction and radial extent on uniform PMMA phantoms with thicknesses of 0.8 – 8.0 cm. The algorithm operates on a pixel by pixel basis by grouping pixels of similar thicknesses into a series of mask images that are then individually deconvolved using Fourier image analysis with a distinct kernel for each image. The algorithm was tested with four experimental phantoms, three step phantoms made of PMMA and one anthropomorphic breast phantom on a full field digital mammography system at energies of 24, 28, 31, and 49 kVp. The true primary signal was measured with a multi hole collimator.

Results: For all 16 studies, the average mean percentage error in estimating the true primary signal was found to be -2.13% and the average rms percentage error was 2.60%.

Conclusion: The new algorithm allows improved accuracy in estimating primary image intensity. It is also expected to improve the accuracy of quantitative dual energy mammography.