

Diffraction Enhanced X-ray Imaging

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Diffraction enhanced imaging (DEI) is a new x-ray imaging method that can be used to independently visualize the refraction and absorption of an object. DEI, developed using a synchrotron x-ray source, produces images that are almost completely scatter-free, which results in an additional source of contrast from the rejection of small-angle scattering. The combination of these two new sources of contrast (refraction and scatter rejection) with absorption has resulted in images of mammography phantoms and tissues that are dramatically improved over standard x-ray radiography. It is potentially applicable to mammography and to radiology in general, possibly for use in non-destructive testing and x-ray computed tomography. The technique and analysis will be presented, as well as recent applications to imaging breast tissue samples, materials imaging (NDT), and tomography. Future research directions and plans to apply the technique will also be addressed.