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Towards X-ray Differential Phase Contrast Mammography

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Phase contrast and scattering-based X-ray imaging are known to provide additional and complementary information to conventional, absorption-based methods and can potentially revolutionize the radiological approach to current breast imaging. Grating-based X-ray interferometry can simultaneously generate differential phase contrast (DPC) and scattering signals of the sample, in addition to the conventional absorption signal, and therefore it is considered as a promising method for better breast cancer screening and diagnosis. Recently, our research team presented the first investigation of native, non-fixed whole breast samples including regular breast tissue and breast cancer formations. In this pioneering work we designed, constructed and operated a differential phase contrast mammography (mammoDPC) demonstrator based on a conventional X-ray source and measured whole native breast specimen directly after mastectomy, under conditions which are very close to the clinical routine. The results demonstrate that this technique can indeed provide additional and useful information to complement and improve the diagnostic process in the clinical setting.

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