Full-field phase imaging in practice and the impact of improved coherence

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Phase contrast imaging may be performed at various levels of sophistication. At times one is satisfied with only an edge enhanced picture of the sample, other applications require to calculate the projected density and so to say convert the edge contrast to area contrast. A number of algorithms exist for the latter, yet mainly the transport of intensity based homogeneous object type of phasing method was deployed in the past years on most imaging beamlines. This method works well on data acquired with X-rays of small coherence length and a single exposure (one defocus image). It is debated to which extend would larger coherence length result in images of higher quality. This question can be addressed from two aspects: higher quality with same scanning times or higher quality with same deposited dose. I will discuss these aspects of phase contrast imaging and demonstrate on examples ranging from lab microCT through synchrotron beamlines [1] to XFEL [2] data. Equally I will highlight recent developments on reconstruction of dynamic phase contrast tomographic data [3].

References

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