Montag | 11. Juni 2018 | 15:00 Uhr | HS II

(Sondertermin)

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Quantum Imaging with incoherent X-rays

For more than 100 years, X-rays have been used to determine the structure of crystals and molecules via coherent diffraction methods. These techniques rely on coherent scattering where incoherence due to wavefront distortions or incoherent fluorescence emission is considered as detrimental. Here we show that methods from quantum imaging, i.e., exploiting higher order intensity correlations, can be used to image the arrangement of sources that scatter incoherent X-ray radiation [1-5]. We present this new Incoherent Diffraction Imaging (IDI) method and discuss a number of properties that are conceptually superior to those of conventional coherent X-ray structure determination [4]. We also report an experimental demonstration in the soft x-ray domain, where higher-order intensity correlations are used to achieve higher fidelities in the image reconstruction and potentially a sub-Abbe resolution [5], and discuss recent experiments aiming at full 3D reconstruction of different samples with atomic resolution using hard x-rays.

References

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Einlader. Prof. Fennel