Diffraction tomography for generalized incident fields

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Abstract: The mathematical imaging problem of diffraction tomography is an inverse scattering technique used to find the material properties of an object. Here, the object is exposed to a certain form of radiation and the scattered wave is recorded. In conventional diffraction tomography, the incident wave is assumed to be a monochromatic plane wave arriving from a fixed direction of propagation. However, plane wave excitation does not necessarily correspond to the measurement setups used in practice: In practical applications, the size of the device emitting the incident field is limited and therefore cannot produce plane waves. Besides, it is common to emit focused beams to achieve a better resolution in the far field. In this talk, I will present our recent results that allow diffraction tomography to be applied to these realistic illumination scenarios.