Non-collinear upconversion of infrared light

Two dimensional mid-infrared upconversion imaging provides unique spectral and spatial information showing good potential for mid-infrared spectroscopy and hyperspectral imaging. However, to extract spectral or spatial information from the upconverted images an elaborate model is needed, which includes non-collinear interaction. We derive here a general theory providing the far field of the upconverted light when two arbitrary fields interact inside a non linear crystal. Theoretical predictions are experimentally verified for incoherent radiation and subsequently applied to previously published data with good agreement.