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Visualizing light with electrons[1] J.P.S. FITZGERALD, R.C. WORD, R. KOENENKAMP, Portland State University — In multiphoton photoemission electron microscopy (nP-PEEM) electrons are emitted from surfaces at a rate proportional to the surface electromagnetic field amplitude. We use 2P-PEEM to give nanometer scale visualizations of light of diffracted and waveguide fields around various microstructures. We use Fourier analysis to determine the phase and amplitude of surface fields in relation to incident light from the interference patterns. To provide quick and intuitive simulations of surface fields, we employ two dimensional Fresnel-Kirchhoff integration, a technique based on freely propagating waves and Huygens' principle. We find generally good agreement between simulations and experiment. Additionally diffracted wave simulations exhibit greater phase accuracy, indicating that these waves are well represented by a two dimensional approximation.

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