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Waveguide characterization with multi-photon photoemission electron microscopy J.P.S. FITZGERALD, ROBERT C. WORD, SEBASTIAN SALIBA, ROLF KOENENKAMP, Portland State University — Multi-photon photoemission electron microscopy (PEEM) images surface interactions of visible light with matter, showing electromagnetic (EM) waves that propagate at or near the surface. Images are interferometric, showing where incident and surface waves are in-phase (bright) and out-of-phase (dark), with strong contrast between regions of high and low rates of photoelectron emission. Interferogram analysis can determine the amplitude, wavelength, phase evolution, and propagation decay length of the surface waves. Most multi-photon PEEM studies focus on surface plasmon polaritons. We show that this technique can also be applied to conducting thin-film waveguides, measuring the properties of confined EM waves in a two-mode slab waveguide made of indium tin oxide on glass, which are consistent with waveguide theory. This research was funded by the US Department of Energy Basic Science Office under contract DE-FG02-10ER46406.

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