

243. Title: Analysis and simulation of generating terahertz surface waves on a tapered field emission tip

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Abstract: Finite difference-time domain simulations and analytical solutions show that terahertz transverse-magnetic surface waves are generated on a tapered field emitter tip by an oscillating terahertz current at the apex, where this current may be caused by photomixing with two lasers in laser-assisted field emission. The tip is modeled as a paraboloid so the analytical solution for the electromagnetic fields may be determined in paraboloidal coordinates using a basis of regular and irregular Coulomb wave functions. The simulations and analytical solutions show that there are quasistationary region and transitional region as the surface waves are generated by the oscillating current at the apex and then propagate on the tapered field emitter tip.