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Complex Near-Field Plasmonic Response of Au Nanospirals[1] JORDAN HACHTEL, RODERICK DAVIDSON, Vanderbilt University, ANDREW LUPINI, BENJAMIN LAWRIE, Oak Ridge National Laboratory, RICHARD HAGLUND, SOKRATES PANTELIDES, Vanderbilt University — Complex metallic nanostructures that support unique near-field surface plasmon modes have shown applications across the fields of photovoltaics, bio-sensing, and even quantum computing. Chiral Au nanospirals not only possess a non-symmetric morphology that results in second-harmonic generation, but possess multiple distinct near-field plasmonic modes that cover a wide range of plasmon frequencies. We use cathodoluminescence (CL) and electron energy loss spectroscopy (EELS) within a scanning transmission electron microscopy (STEM) to study the surface plasmons and map them with nanoscale precision. The two techniques are complementary as EELS measures excitations in the sample, while CL measures the subsequent radiative decays. We STEM-EELS/CL to map and analyze the spatial profile, intensity and polarization response of the intricate near-field plasmon modes in these versatile nanostructures.

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