

Few-Cycle Surface Plasmon Polariton Generation by Rotating Wavefront Pulses

F. Pisani¹, A. Macchi^{2,1}

¹University of Pisa, Italy; ²CNR-INO, Italy

A concept for the efficient generation of Surface Plasmon Polaritons (SPPs) with a duration of very few cycles is presented. The scheme is based on the coupling of a laser pulse with wavefront rotation on a grating target, so that the resonance condition for SPP excitation is satisfied only for a brief time interval. The feasibility and robustness of the technique is investigated by means of simulations with realistic parameters. In optimal conditions, we find that a 29.5 fs pulse with 800 nm wavelength can excite a 3.8 fs SPP (~ 1.4 laser cycles) with a peak field amplitude 2.7 times the peak value for the laser pulse.