Bow-tie nano-antenna assisted generation of extreme ultraviolet radiation

We report on the generation of extreme ultraviolet radiation utilizing the plasmonic field enhancement in arrays of bow-tie gold optical antennae. Furthermore, their suitability to support high-order harmonic generation is examined by means of finite-difference time-domain calculations and experiments. Particular emphasis is paid to the thermal properties, which become significant at the employed peak intensities. A damage threshold depending on the antenna length is predicted and confirmed by our experimental findings. Moreover, the gas density in the vicinity of the antennae is characterized experimentally to determine the number of atoms contributing to the measured radiation, which is almost an order of magnitude larger than previously reported.

Laser Quantum Product
venteon one

Institute
1 Leibniz Universität Hannover, Institut für Quantenoptik, Welfengarten 1, D-30167 Hannover, Germany
2 QUEST, Centre for Quantum Engineering and Space-Time Research, Hannover, Germany
3 Department of Physics and Center for Applied Photonics, University of Konstanz, D-78457 Konstanz, Germany
4 Technische Universität Chemnitz, Institut für Physik, Dynamik Nanoskopischer und Mesoskopischer Strukturen, D-09107 Chemnitz, Germany
5 Thin Films and Physics of Nanostructures, Department of Physics, Bielefeld University, D-35501 Bielefeld, Germany