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Enhanced second harmonic generation from aperiodic arrays of gold nanoparticles ANTONIO CAPRETTI, ECE Dept. and Photonics Center Boston University & DIEL University of Naples Federico II, GARY WALSH, ECE Dept. and Photonics Center Boston University, JACOB TREVINO, Div. of MSE Boston University, GIOVANNI MIANO, DIEL University of Naples Federico II, LUCA DAL NEGRO, ECE Dept. and Photonics Center Boston University & Div. of MSE Boston University — Second harmonic generation (SHG) from planar arrays of metal nanoparticles has been investigated in the last years for several configurations of particle shape and excitation-collection directions. In particular L-shaped particles have been employed to remove centrosymmetry. In this work we study SHG dependence on the array geometry, by comparing the generation efficiency of periodic arrays with that of deterministic aperiodic ones, namely Fibonacci and Golden Angle Spiral, lacking planar centrosymmetry. Two excitation-collection configurations are employed to test fabricated arrays. The whole range of average particle separation is explored, from closed spaced particles (plasmonic regime) to far spaced particles (photonic regime). We observe that SHG efficiency can be increased by arranging centrosymmetric particles in aperiodic arrays without inversion symmetry, both in the plasmonic regime and in the photonic one. We also demonstrate that Fibonacci and Golden Angle Spiral arrays perform differently in respect of the average interparticle separation and the collection direction, allowing the tunability of SHG extraction.

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