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Quantum and Classical Plasmonic Phenomena in Nanoparticle Arrays ALEXANDER GOVOROV, LUCAS BESTEIRO, LAROUSSE KHOSRAVI KHORASHAD, XIANG-TIAN KONG, Ohio University, EVA-MARIA ROLLER, TIM LIEDL, Ludwig-Maximilians-Universitt Mnchen — Using both classical and quantum approaches, we model plasmonic phenomena in nanoparticle (NP) dimers and trimers. Using a model of three nanoparticles, we propose a mechanism of non-dissipative and ultrafast plasmon passage assisted by hot spots. For this, the NP trimer should include two Au-NPs and one Ag-NP. In the Au-Ag-Au trimer, the two Au-plasmons become coupled via the virtual plasmon of the Ag-NP. The efficient and ultra-fast passage of the Au-plasmons assisted by the virtual Ag-plasmon only becomes possible when the inter-NP gaps in the trimer are small. In this coupling regime, the inter-NP gap regions become plasmonic hot spots that greatly enhance the plasmonic passage effect. At this moment, the plasmonic passage phenomenon was already observed experimentally using optical spectroscopy and the DNA-origami NP complexes. Other systems of our interest were a NP dimer and a nanostar with plasmonic hot spots. For those systems, we predict strong enhancement of the generation of energetic (hot) carriers [1,2]. [1] Besteiro, L.V.; Govorov, A.O. *J. Phys. Chem. C* **120**, 19329 (2016). [2] Kong, X.-T.; Wang, Z.; Govorov, A.O. *Adv. Optical Mater.*, doi: 10.1002/adom.201600594.

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