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Excitons and plasmons in coupled nanoparticles and nanowires PEDRO L. HERNANDEZ-MARTINEZ, ALEXANDER O. GOVOROV, Ohio University — In this study, we develop theoretical models of coupled nanoparticles (NPs) and nanowires (NWs). In particular, we focus on exciton energy transfer between NPs and NWs and consider both metal and semiconductor nanocrystals. We obtain analytical equations for the long distance limit and a numerical solution for the general case. For long distances, the energy transfer rate is proportional to 1/dˆ5, where d is the distance between NP and NW [1]. In a coupled NP-NW structure, excitonic energy can be efficiently extracted and channeled to nanowires/nanotubes by utilizing the Förster energy transfer mechanism [1,2]. The calculated energy transfer rates are in good agreement to the experimental values [2]. The NP-NW system has potential for applications in optoelectronic devices and sensors [3]. [1] P. Hernandez-Martinez, A. O. Govorov, Phys. Rev. B, B 78, 035314 (2008). [2] J. Lee, A. O. Govorov, and N. A. Kotov, Nano Letters 5, 2063-2069 (2005). [3] J. Lee, P. Hernandez, J. Lee, A. O. Govorov, and N. A. Kotov, Nature Materials, 6, 291 – 295 (2007).

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