Abstract Submitted
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Förster Resonance Energy Transfer between Nanoparticles and Nanowires. PEDRO L. HERNANDEZ-MARTINEZ, ALEXANDER O. GOVOROV, Ohio University — We develop a theoretical model to describe Förster resonance energy transfer (FRET) between semiconductor nanoparticles (NPs) and nanowires (NWs). We obtain an analytical equation in the dipole limit and a numerical solution for the general case. We find that, for FRET between NPs and NW, the transfer time is proportional to $1/d\hat{}5$, where d is the distance between NP and NW. The calculated transfer time between CdTe NPs and NWs is 16.9 ns. This number agrees well with the experimental value, 16 ns [1]. We also found good agreement with the experimental data [1] for other NP-NW distances. For a NW material, we explore a semiconductor (CdTe) and metals (Au and Ag) [2]. In a NP-NW bioconjugate, excitons flow from NPs to a NW and then become collected in a NW. When voltage is applied across a NW, this system is expected to demonstrate enhanced photo-current and photo-voltage responses. The enhancement effect comes from energy channeling from NPs to a NW due to FRET. This system can be used in optoelectronic devices and energy conversion systems. [1] J. Lee, A. O. Govorov, and N. A. Kotov, Nano Letters 5, 2063-2069 (2005). [2] J. Lee, P. Hernandez, J. Lee, A. O. Govorov, and N. A. Kotov, **Nature Materials**, 6, 291 – 295 (2007)..

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