Max-Planck-Institut für Struktur und Dynamik der Materie

Max Planck Institute for the Structure and Dynamics of Matt

CANCELLED

Wednesday, March 11 1:00 a.m.
CFEL Seminar roo 99)

Akbar Sa
Departme ake Forest University, Winston-Salem, NC 27109, USA

Pa y-Body Resonance Energy Transfer: QED Theory

y success of the theory of molecular quantum electrodynamics (QED) [1,2] bility to rigorously treat both radiation-matter and inter-particle interactions. An ample of the latter that is to be presented in this seminar is resonance energy transfer (RET) [3] between an excited donor species and a ground state acceptor molecule separated by a distance R. Migration of energy occurs via the propagation of a single virtual photon. A diagrammatic perturbation theory calculation of the Fermi golden rule exchange rate for oriented and isotropic systems is reviewed first. It is shown how R^{-6} radiationless (Förster) and R^{-2} radiative transfer emerges from the general result as near- and far-zone asymptotic limits, respectively. Theory is extended by including the effect that one or two additional passive, polarizable molecules have in relaying energy between donor and acceptor [4-7]. Insight is gained into exchange of energy taking place in a medium by comparing the present formulation of a many-body theory that explicitly accounts for direct and indirect transfer mechanisms with macroscopic treatments of an environment.

[1] A. Salam, *Molecular Quantum Electrodynamics*, John Wiley & Sons, Inc., 2010.
[2] D. L. Andrews, G. A. Jones, A. Salam and R. G. Woolley, *J. Chem. Phys.* **148**, 040901 (2018).
[3] A. Salam, *Atoms* **6**, 56 (2018).
[4] A. Salam, *J. Chem. Phys.* **136**, 014509 (2012).
[5] A. Salam, *J. Phys. Chem. A* **123**, 2853 (2019).
[6] A. Salam, *J. Chem. Phys.* **151**, 244119 (2019).
[7] J. S. Ford, A. Salam and G. A. Jones, *J. Phys. Chem. Lett.* **10**, 5654 (2019).

Host: Michael Ruggenthaler, Angel Rubio

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