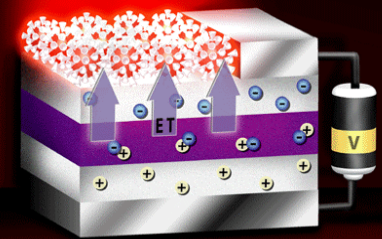


CU Physics Department Colloquium

Monday, April 26, 2010 4:10 PM 428 Pupin Hall

Cavity QED in the Solid State: Semiconductor Quantum Dots and Photonic Crystal Cavities

At a 1946 meeting of the American Physical Society, E. Purcell discussed the possibility of enhancing the spontaneous emission rate of atoms which are matched to a resonant cavity. 'Spontaneous emission' and 'cavities' are concepts associated with lasers, but the implications of matched cavities go far beyond lasers. Appropriately engineered cavities can achieve strong light-matter coupling that can result in new quantum mechanical states, and thus, applications range from ultra-efficient light sources to new testbeds for quantum information processing. Recently, considerable progress has been made in such light-matter coupling in the solid state. Solid state systems have been more challenging, since they are far more susceptible to decoherence and optical loss. This talk will give an example of such a solid state system comprised of semiconductor quantum dots, which take on the role of 'atoms' and high quality photonic crystal cavities. Weak and strong coupling have been demonstrated, but in turn provide the groundwork for further questions and challenges.



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