University of Texas at San Antonio

Department of Physics & Astronomy

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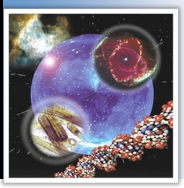
Time: 3:00 p.m.-4:00 p.m.
BB 3.04.18

Theory and Possible Applications of a Classical Orbital Optomechanical Effect

Current efforts in the area of optomechanics are directed toward observation of quantum-mechanical properties of macroscopic oscillators via their interaction with light. However, a number of recent experiments brought to attention new optomechanical phenomena, where the field of whispering gallery modes (WGM) was used to induce classical orbital motion of unbound nanoparticles. While non-optical interactions such as viscosity played an important role in these experiments, they clearly demonstrate new aspects of the mechanical action of light, which must be explored in their most fundamental and pure form. Here we develop a theory of the optomechanical interaction of a free particle and a spherical microresonator based on the self-consistent solution of Maxwell's equations for the fields of the resonator-particle system. Our results give a clear picture of coupled field-particle dynamics arising from this interaction and provide foundation for possible applications of this phenomenon.



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