

Departments of Physics Colloquium

Dicke Superradiance, Entanglement and Quantum interference

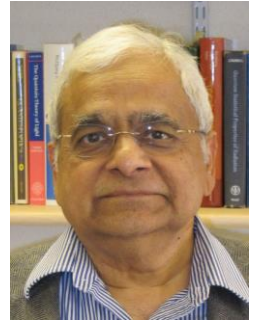
Girish S Agarwal

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Friday, October 30, 2015

1:30 – 2:30 PM

Venue: OE 134, MMC



Abstract: As the superposition principle is basic to quantum mechanics, the interference effects occur very widely in quantum systems. Interferences are especially important in quantum optics and I will demonstrate how interferences are the key to understand superradiance. I will show that the entangled character of the Dicke states leads to many interfering paths which determine the probability of photon emission. Since Dicke states are multiparticle states, their production remains a challenge and has been realized for few atoms. A new option is the heralded production of such states. Following this approach we show that the Dicke superradiance can be produced starting from an initially uncorrelated system. These ideas are quite generic and applicable to a wide variety of quantum sources like trapped atoms, ions, quantum dots or NV-centers. Finally I discuss the quantum statistics of superradiance and the existence of collective superradiance like effects in light scattering.

Biography: Girish Agarwal, FRS, an expert in quantum optics, currently holds the Noble Foundation Chair and Regents Professorship at Oklahoma State University. His latest book “Quantum Optics” is published by the Cambridge University Press. His work has been recognized by a number of awards, including the Max-Born Prize of the Optical Society of America, the Physics prize of The World Academy of Sciences, the Humboldt Research Award of Germany. He held the Indian National Science Academy’s Albert Einstein Research Professorship.

The event is free and open to the public.

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