



THE CHINESE UNIVERSITY OF HONG KONG  
Department of Physics  
**COLLOQUIUM**

**The Study of Optical Superlattice for  
Nonlinear Photonics, Laser and Quantum Optics**

*by*

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*Date: July 31, 2009 (Friday)*

*Time: 4:00 - 5:00 p.m.*

*Place: L2, Science Centre, CUHK*

*(Light refreshments will be served 20 minutes prior to the colloquium.)*

ALL INTERESTED ARE WELCOME

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**Abstract**

For the recent two decades, spurred by the success of the semiconductor superlattice and quasi-phase-matching (QPM) technique, Optical superlattice has become a hot topic in nonlinear optics, condensed matter physics and photoelectronics. Optical superlattice is a nonlinear crystal in which its physical properties associated with third-rank tensors like nonlinear susceptibility tensor  $\chi^{(2)}$  are modulated with ferroelectric domains, artificially according to some sequence, forming so-called superlattice structure, whereas those associated with even-rank tensors like dielectric constant (refractive index) remain constants. This makes the superlattice different from a conventional nonlinear crystal. In the case that the wavelength of light wave is comparable with or smaller than the size of domain, that is, the reciprocal vector of the modulated structure is comparable or larger than the wave vector of light wave, many fancy physical effects may create through the interaction of the wave vectors and the reciprocal vectors of superlattice. For example, the enhancement of optical frequency conversion, the amplification of light scattering signal, and the generation of entangled photon pair and polariton excitation etc. The interests in optical superlattice lie not only in its fundamental research but also in practical applications. Many of them have been put to use in novel devices matched with contemporary nonlinear photonics, laser and quantum optics.

**\*\*\* Talk will be delivered in Mandarin \*\*\***

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