

Joint CQSE and CASTS Seminar

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***Title: From Infinities in QED to the
General Renormalization Group***

Date : September 13, 2013, 2:30 PM ~ 3:30 PM

Place : Room 104, New Physics Building, National Taiwan University

Abstract: The first calculations of Quantum Electrodynamics were plagued with infinities and these infinities seemed to be an unavoidable consequence of point-like particles and conservation of probabilities. A bizarre "cooking" recipe, called renormalization, was eventually found to derive finite answers from intermediate infinite quantities, which would have been immediately dismissed if it had not led to results in remarkable agreement with experimental data. For quite some time the procedure remained an embarrassment for quantum field theorists. Several authors noticed that the renormalization involved some choice of parametrization and the invariance of physics under change of parametrization was called renormalization group. It has been Wilson's main contribution to have realized that a more general renormalization group can be constructed that allows investigating many systems with a large number of locally interacting degrees of freedom. In this way the success of the renormalization method could be logically understood but also another outstanding problem could be solved, the non-Gaussian behavior of continuous phase transitions in the critical domain.

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