# 凝縮系物理学ゼミナール

# Condensed Matter Seminar

Location: Room 413, School of Science Bldg. 5 (理学 5 号館 413 号室)

Date: 13:30-15:00, Wednesday, 23 May 2012

## Entanglement perturbation theory: idea, recent developments and prospect for quantum chemistry

Speaker: **Prof. Sung Gong Chung**

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Abstract:

Numerical renormalization group, DMRG being the champion, has been an important player in theoretical understanding of strong correlation phenomena in condensed matter and related fields. Over the last decade in particular, we have seen some explosive developments along the lines of DMRG, highlighting the concept of matrix, tensor product representations of state vectors and operators, with a great hope that we are close to a satisfactory description of many-body physics in two space dimensions, only to find nature's stubborn resistance to an accurate numerical analysis. The difficulty may be of two kinds, numerical stability and computational accuracy. On one hand, numerical-RG is well known for its numerical stability with, however, apparent lack of accuracy in two space dimensions. On the other hand, if one pursues computational accuracy in non-RG methods, numerical instability caused by a dangerous nonlinearity is a serious issue.

In this talk, I will introduce EPT as a non-RG many-body method, demonstrate its competitiveness in comparison with DMRG, and discuss its prospect for quantum chemistry, which bares essentially the same issue as in two space dimensions.