

IOA-IOPP Joint Seminar

Dynamical Scalegenesis

~ Origin of Mass Bridging QCD Over Planckian Physics ~

Date 10:30 -12:00, May 21st (Tuesday)

Place Room 1229, 12th floor, Building 9 (物理学院报告厅)

Invited Speaker

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Abstract

The origin of mass is one of the most fundamental and important mysteries that one can tackle by studying the field of particle physics.

One key idea to access this issue would be supplied by scale generation mechanism in cosmic history of our Universe (dubbed "scalegenesis").

The scale symmetry might have been broken linking with the electroweak symmetry breaking, leading to the origin of mass for particles, which would also come along with spontaneous breaking of other extended symmetries when one goes beyond current standard scenario of particle physics, called the standard model.

Such a scale symmetry has to be realized in quantum field theories, even including Planck scale physics, so it is necessary to suffer from the usual fine-tuning problem, or gauge-hierarchy problem.

This talk will introduce a natural scalegenesis, called "dynamical scalegenesis", to account for the origin of mass, as well as a possible solution to the gauge-hierarchy problem.

The dynamical scalegenesis is built upon the dimensional transmutation, learned from the origin of mass in QCD, which is predicted to take place at around TeV energy scale, to be tied with a nontrivial over-Planckian theory.