

[2015 2nd CTPU Seminar]

- \* **Title:** Eternal Higgs inflation and cosmological constant problem
- \* **Speaker:** Kin-ya Oda (Osaka University)
- \* **Date:** 4:00 PM, January 21 2015
- \* **Place:** CTPU Seminar Room
- \* **Abstract:** We investigate the Higgs potential beyond the Planck scale in the superstring theory, under the assumption that the supersymmetry is Sbroken at the string scale. We identify the Higgs field as a massless state of the string, which is indicated by the fact that the bare Higgs mass can be zero around the string scale. We find that the large field limit can be classified into three types: runaway, periodic, and chaotic. We verify that such universal behavior occurs in the toroidal compactification of the non-supersymmetric  $SO(16) \times SO(16)$  heterotic string. All these cases fit in the picture that the Higgs field is the source of the eternal inflation. The first case has a runaway vacuum with vanishing energy, which corresponds to opening of an extra dimension. The observed small value of the cosmological constant of our universe may be explained if this vacuum is degenerate with ours, as is suggested by the multiple point principle.