The Hong Kong University of Science and Technology

Department of Mathematics

<u>Colloquium talk in Mathematics</u>

Toward the classification of holomorphic vertex operator algebras of central charge 24

By

Prof. Ching Hung LAM

Academia Sinica

<u>Abstract</u>

A simple vertex operator algebra (VOA) V is said to be holomorphic if it has only one irreducible, up to isomorphism and all V-modules are completely reducible. In 1993, Schellekens determined the possible Lie algebra structures for the weight one subspaces of holomorphic vertex operator algebras of central charge 24. There are 71 cases in his list but not all cases were constructed at that time.] Moreover, it is believed that the VOA structure of a holomorphic VOA of central charge 24 is uniquely determined by the Lie algebra structure of its weight one subspace. This would be an analogue of the famous classification of (positive definite) even unimodular lattices of rank 24.

In this talk, we will discuss the recent progress on the classification. We will first discuss the constructions of all 71 cases in Schellenkens' list using orbifold construction. We will also discuss the uniqueness conjecture. In particular, we will show that the VOA structures of certain holomorphic VOAs of central charge 24 are uniquely determined by the Lie algebra structures of their weight one subspaces using a technique which we call "reverse orbifold construction".

Date :   *Thursday, 27 April 2017*

Time: *2:00 p.m. – 3:00 p.m.*

Venue: *Room 5566, Academic Building (near Lifts 27&28), HKUST*

All are welcome!