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THE HONG KONG UNIVERSITY OF SCIENCE & TECHNOLOGY

Department of Mathematics

ALGEBRA AND GEOMETRY SEMINAR

Chiral homology, the Zhu algebra, and Rogers-Ramanujan

by

Prof. Jethro van Ekeren

Instituto de Matemática Pura e Aplicada (IMPA)

Abstract

Graded dimensions of rational vertex algebras are modular functions. The proof of this celebrated theorem by Y. Zhu centres on geometric objects attached to elliptic curves known as conformal blocks, and their behaviour in the limit as the underlying curve becomes singular. In this limit, roughly speaking, conformal blocks pass to the degree zero Hochschild homology of Zhu's associative algebra. On the other hand, conformal blocks have been interpreted by Beilinson and Drinfeld as the degree zero component of a theory of chiral homology. It is therefore natural to wonder if the relationship extends to higher homological degrees. We are indeed able to extend this story to homological degree 1 for classically free vertex algebras, and in the process we discover relations with objects of number theory such as the Rogers-Ramanujan identity and its generalisations. This is joint work with R. Heluani and G. Andrews.

Date : 16 August 2023 (Wednesday)

Time : 3:00pm – 4:30pm

Venue : Room 5506 (Lifts 25/26)

All are Welcome!