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沖縄科学技術大学院大学

VISITING PROGRAM

Public Lecture

3-Manifolds and Langlands Duality

Rescheduled

2026 THU. **SEP. 03**

16:10–17:10

HYBRID L4E48, ZOOM

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Mathematics has two fundamental subjects: numbers and shapes. Although they may appear very different, there are many deep analogies between them. One of the most mysterious is the analogy between algebraic number theory and 3-dimensional topology, in which prime numbers correspond to knots. Motivated by this analogy, we may ask the following question: What is the topological counterpart of Langlands duality for 3-manifolds?

Surprisingly, Kapustin and Witten proposed an answer to this question from the perspective of theoretical physics. Using gauge theory, they interpreted Langlands duality as a form of electromagnetic duality. More recently, this conjectural picture has been brought into mathematics through derived algebraic geometry, a brave new framework for algebraic geometry built on ideas from homotopy theory.

In this talk, we will survey recent progress toward this conjecture, emphasizing the perspective of 4d TQFT and the relationships among the theories associated with different gauge groups.

Tasuki Kinjo

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Tasuki Kinjo is an assistant professor of pure mathematics at RIMS, Kyoto University. He was born to parents from Okinawa and spent several years of his childhood there. He began his research career in Donaldson–Thomas theory. After concluding that Calabi–Yau threefolds (six-dimensional as real manifolds!) were perhaps too difficult for humans, he turned to applications of derived geometry to gauge theory on real three-manifolds.

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