

Mentor Lecture Series

Organizer: Daniel Erman and Bianca Viray

Monday, 4:10–5:00pm, 60 Evans

May 8 **Richard Borcherds**, UCB

What is a field theory

There are several sets of axioms for quantum or statistical field theory, most of which seem to have little in common. For example, one set of axioms talks about nets of von Neumann algebras, another talks about measures on a space of distributions, a third talks about functors from cobordism categories, and a fourth talks about unbounded operators on a Hilbert space. It is not at first sight clear what any of these sets of axioms has to do with all the Feynman diagrams that physicists are fond of writing down. Moreover there is a strong suspicion that some of the most important examples of field theories, such as quantum electrodynamics and the standard model, do not satisfy any of these sets of axioms. I will try to explain what a quantum field theory really is.

The Mentor Lecture Series is designed for first and second year graduate students. The series aims to acquaint beginning graduate students with potential dissertation supervisors whom they might not otherwise closely encounter, and to impart a taste of research activity in the mathematics department in order to help beginning students choose fields of specialization.