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4:30 p.m.
Education Building 191

Broken Symmetries

There is a remarkable connection pioneered by Alain Connes between operator algebras, which originated as the mathematical models for quantum mechanical systems, and abstract structures arising from number theory. This connection is based on the fact that systems of numbers and of sub-atomic particles share some common features that make them tractable with the same mathematical tools.

One of these features is the prominent role that symmetries play in both cases; another is the relevance of pairs of operations that do not commute with each other. For quantum systems, the non-commuting operations are the measurements of position and momentum of particles; for number systems, they are addition and multiplication.

I will give a nontechnical overview of the subject, discussing its motivations and implications, and then briefly report some recent developments.

University of Regina

Mathematics and Statistics

Pacific Institute FOR THE MATHEMATICAL SCIENCES