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50 Years of Energy Flux in Illinois

Saturday 8 November 2025 14:10 (1 hour)

Collider experiments offer a unique opportunity to study the Standard Model, and to search for new physics, new interactions, and new principles of nature. After a particle collision, the underlying microscopic physics gets imprinted into detailed correlations in macroscopic energy flux, much in analogy to how our cosmic history is imprinted into correlations in the Cosmic Microwave Background. In quantum field theory (QFT), energy flux in colliders is described by energy flow operators, first introduced 50 years ago this December in early studies of quantum chromodynamics. These observables, which arise as direct theoretical models of collider experiments, have also played a crucial role in contemporary developments in formal QFT and gravity. Recently it has become possible to directly measure these observables in new energy regimes, and with unprecedented precision, both at the Large Hadron Collider, and with resurrected data from the LEP experiments, establishing an exciting connection between real world phenomenology, and advances in formal QFT. In this talk I will present some recent highlights from this program, ranging from record precision extractions of Standard Model parameters, to new measurements of properties of the Quark Gluon Plasma, and searches for physics beyond the Standard Model.

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Session Classification: Keynote Talks