Contribution ID: **110** Type: **not specified**

Quantum Field Theory of Magnetic Monopoles

Thursday 4 December 2014 15:40 (35 minutes)

In spite of a vast amount research over several decades, the behaviour of magnetic monopoles in quantum field theory is still poorly understood. Quantum field theory formulation of elementary magnetic monopoles is plagued by lack of manifest locality and Lorentz invariance, which makes calculations very cumbersome. Solitonic 't Hooft-Polyakov monopoles avoid this problem, but even in their case calculating genuine quantum effects is difficult, and very few results exist. Even basic observables such as the pair production of rate of monopoles in particle collisions cannot currently be calculated. I will describe a non-perturbative lattice field theory approach to this problem, and present results for both 't Hooft-Polyakov and elementary magnetic monopoles.

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Session Classification: Parallel 5: Strongly coupled gauge theories