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Csaba Csaki (Cornell)

Thursday, 27 October 2022 11:30 (30 minutes)

[Session Chair: Anton Kapustin (Caltech)]

"Magnetic scattering: pairwise little group and pairwise helicity"

I explain the concept of the pairwise little group which leads to the existence of pairwise helicity for multi-particle states. This pairwise helicity is needed to describe the scattering of magnetically charged particles. I show how to implement pairwise helicity into the spinor-helicity formalism and with its help construct the general 3 point functions. For 2->2 scattering we use the generalization of the partial wave decomposition and derive the famous helicity flip in the lowest partial wave as a simple consequence of a generalized spin-helicity selection rule, as well as the full angular dependence for the higher partial waves. We show a potential resolution of Callan's long-standing semiton problem in our approach. Finally we show how these pairwise states can be understood dynamically as dressed states which incorporate the effects of soft photons, and provide a novel fully field theoretic derivation of Dirac quantization in terms of a geometric Berry phase.