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Entanglement and geometry in non-relativistic scattering

Recent work has found that minimization of quantum entanglement in low-energy baryon-baryon scattering has interesting phenomenological implications, and leads to a novel view of emergent symmetries. I will review these developments as well as extensions to three-body systems and systems involving pions. Then, in an effort to provide insight into the role of entanglement in scattering, I will show how the S-matrix which describes non-relativistic scattering of particles interacting via finite-range forces, can be obtained from a geometric action principle in which space and time do not appear explicitly. In general, isotropic scattering of non-relativistic spin-J fermions has a geometric description as a trajectory between vertices of 2J+1-cube self-dual honeycombs. I will describe the relation between the space-time effective field theory and the space-time-independent geometric theory for some simple cases, and focus on the manner in which unitarity, causality and spin entanglement are manifest in the geometric description.

Friday 2nd February 2024, 14h00
IJCLab, Build. 100, Room A018