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Séminaire de Physique Nucléaire Théorique

Entanglement and geometry in non-relativistic scattering

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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.

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