

Contribution ID: 94

Type: 2.Parallel session talk

## Entanglement suppression and low-energy scattering of heavy mesons

Thursday, 26 September 2024 10:05 (20 minutes)

This talk is based on [Phys.Rev.D 110 (2024) 1, 014001]. Recently entanglement suppression was proposed to be one possible origin of emergent symmetries. Here we test this conjecture in the context of heavy meson scatterings. The low-energy interactions of  $D^{(*)}\bar{D}^{(*)}$  and  $D^{(*)}D^{(*)}$  are closely related to the hadronic molecular candidates X(3872) and  $T_{cc}(3875)^+$ , respectively, and can be described by a nonrelativistic effective Lagrangian manifesting heavy-quark spin symmetry, which includes only constant contact potentials at leading order. We explore entanglement suppression in a tensor-product framework to treat both the isospin and spin degrees of freedom. Using the X(3872) and  $T_{cc}(3875)^+$  as inputs, we find that entanglement suppression indeed leads to an emergent symmetry, namely, a light-quark spin symmetry, and as such the  $D^{(*)}\bar{D}^{(*)}$  or  $D^{(*)}D^{(*)}$  interaction strengths for a given total isospin do not depend on the total angular momentum of light (anti)quarks. The X(3872) and  $T_{cc}(3875)^+$  are predicted to have five and one isoscalar partner, respectively, while the corresponding partner numbers derived solely from heavy-quark spin symmetry are three and one, respectively. The predictions need to be confronted with experimental data and lattice quantum chromodynamics results to further test the entanglement suppression conjecture.

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Session Classification: Parallel 2: Hadrons and related high-energy physics

Track Classification: Hadrons and related high-energy physics