

Vector Meson–Baryon Femtoscopic Insights into Spectroscopy and Chiral Symmetry

Monday, 29 June 2026 10:00 (30 minutes)

Femtoscopic provides indirect access to fundamental QCD phenomena beyond vacuum interactions, particularly chiral symmetry breaking and its partial restoration, through its sensitivity to hadron–hadron interactions. In vacuum, spontaneous chiral symmetry breaking leads to distinct hadronic excitations and nondegenerate spectral functions, such as those of the ρ and a_1 mesons. In a nuclear medium, the reduction of the quark condensate modifies these spectral functions, inducing broadening, possible mass shifts, and eventual overlap, which signals partial chiral symmetry restoration. A quantitative description of these effects requires reliable input on vector–baryon interactions, notably the ρ – N system.

Recent femtoscopic measurements of ϕ – p and ρ^0 – p correlation functions~\cite{ALICE:2021cpv,ALICE:2025flv} provide the first direct access to interactions of short-lived vector mesons. While initial analyses relied on the Lednicky–Lyuboshitz approximation~\cite{Lednicky:1981su}, later studies~\cite{Feijoo:2024bvn,Abreu:2024qqo} demonstrate the need for fully unitary coupled-channel approaches to reliably extract scattering parameters. Building on measurements in the $S = 0$ sector, current efforts extend to systems with nonzero strangeness~\cite{Encarnacion:2025luc,Lin:} where near-threshold states and coupled-channel dynamics are expected to play a key role. The strong sensitivity of correlation functions to these effects establishes femtoscopic as a versatile tool to study hadronic interactions, exotic states, and threshold phenomena across flavor sectors. The content of this latter set of developments will be addressed in detail in my talk.

Collaboration

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Session Classification: Plenary session

Track Classification: Hadron-hadron interactions