



Contribution ID: 87

Type: **Talk**

Extending the finite volume formalism to the $N\pi\pi$ system at maximal isospin

Friday 7 November 2025 17:20 (20 minutes)

We describe the extension of the relativistic field theoretic finite-volume formalism to $N\pi\pi$ scattering states at maximal isospin, $I = 5/2$, focusing on the new features that arise in this system.

We illustrate the application of the formalism by providing a sample numerical application that includes the Δ resonance in the $N\pi$ subchannel.

We study the singularities in $N\pi\pi$ amplitudes arising from $N\pi\pi\pi$ intermediate states, and find that our subthreshold cutoff functions must be modified to avoid such singularities.

This is a step on the way to a formalism for the $I = 1/2$ (Roper) channel, which will require the inclusion of mixing with $N\pi$ states.

We explain why these cannot be included by treating the nucleon as a pole in p -wave $N\pi$ scattering, an approach that has been successful in studying DD^* scattering using the three-particle $DD\pi$ formalism.

Parallel Session (for talks only)

Hadronic and nuclear spectrum and interactions

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Session Classification: Hadronic and nuclear spectrum and interactions