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Progress in the Partial-Wave Analysis Methods at COMPASS

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COMPASS aims at extracting the excitation spectrum of light and strange mesons in diffractive scattering. Resonances are identified through partial wave analysis, which inherently relies on analysis models. Besides statistical uncertainties, systematic effects connected to the analysis methods are a key challenge. We will discuss some sources of systematics connected to $\pi^-\pi^-\pi^+$ and $K^0_sK^-$ final states and present methods of their remedies. We have developed a new approach using a-priori knowledge of signal continuity over adjacent final-state-mass bins to stably fit a large pool of partial-waves to our data, allowing a clean identification of very small signals in our large data sets. For two-body final states such as $K^0_sK^-$, mathematical ambiguities in the partial-wave decomposition, result in different combinations of amplitude values to describe the same intensity distribution. We will discuss these ambiguities and present solutions to resolve or at least reduce the number of solutions. Resolving these issues will allow complementary analyses of the a_J-like resonance sector in these two final states.

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Collaboration

COMPASS

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