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# First results from an extended freed-isobar analysis at COMPASS

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One of the goals of the COMPASS experiment is the precision study of light meson spectroscopy, with data for various final states collected in two years of data taking. With $46 \cdot 10^6$ exclusive events, the process $\pi^- p \to \pi^-\pi^+\pi^- p$ constitutes the flagship of these channels.

Based on this data set, an extensive Partial Wave Analysis, using a total of 88 partial waves in the model, was published in 2017 [1]. Along with it, results of a first study of the so-called freed-isobar method were shown. Here, the fixed amplitudes for appearing $\pi^+\pi^-$ intermediate states used in the conventional analysis were replaced by sets of piecewise constant functions to extract the amplitudes of the $\pi^+\pi^-$ subsystems directly from the data. In this first study, this was done for three $J^{PC} = 0^{++}$ intermediate $\pi^+\pi^-$ states.

The promising results inspired further extension of this method, by also including intermediate $\pi^+\pi^-$ states with $J^{PC} = 1^{--}$ and $2^{++}$. With this extension of the sets of freed waves, mathematical ambiguities in the model arise due to the much higher freedom in the model. We will present first results of these extended studies on COMPASS data along with methods to overcome the arising ambiguities.

[1] COMPASS collaboration, Phys.Rev. D95 (2017) no.3, 032004

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