

Automated selection of partial waves for meson analysis

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The measurement of the excitation spectrum of light-quark hadrons often requires to apply partial-wave analysis methods. The building blocks of the physical models used in such analyses are the partial waves, which are defined by the quantum numbers and the decay paths of the produced resonances. In diffractive dissociation reactions, in principle, infinitely many partial waves can contribute. However, for finite data samples, only a finite number of waves carry relevant information. Finding these waves is in general a difficult task. We present a method that derives sparse models from systematically constructed sets of possible partial waves by introducing a regularization term into the likelihood function. As an example, we show results of the application of this method to simulated data for diffractively produced $\pi^- \pi^- \pi^+$ events.

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