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From Experiment to Pole Parameters in a Theory-Independent Way (Fixed-t Single-Energy PWA + Laurent-Pietarinen model for pole extraction)

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Pole parameters, as the minimally model dependent link between measurements and QCD approaches, were always extracted from experiment through procedures notably relying on elaborated microscopic theories. Partial waves were obtained by fitting free parameters of a microscopic model to experimental data, and poles were extracted by performing the analytic continuation of the result into the complex energy plane. This introduced important model dependence upon a particular theory, what was quite often very difficult to take into account in order to get a true, theory-independent result. We have shown that this can be bypassed as using only fixed-t analyticity as a constraint produces continuous, unique, single-energy PWA, and Laurent-Pietarinen expansion based only on conformal mapping generated expansion of regular part of Laurent decomposition very precisely extracts poles from such theory-independent set of partial waves. So, combining the two, fixed-t SE PWA and L+P expansion, a theory independent procedure is formulated which obtains pole parameters directly from experimental data using only general features like analyticity and unitarity.

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