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Amplitude Analysis of D decays to three hadrons in the LHCb experiment

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The study of a heavy meson decaying to three lighter mesons can be described, in general, as quasi-two-body processes through the production of resonance intermediate states. To understand the dynamics of these processes, a full amplitude analysis of the corresponding Dalitz Plot (the two-dimensional representation of the decay phase space) is necessary. The most naïve way to describe it is to use the so-called Isobar Model where the total amplitude is written as a coherent sum of the individual resonance amplitudes, typically described as a product of the resonance propagator, angular functions and form factors. However, the Isobar Model turns out to be inadequate when dealing with broad scalar states and other approaches such as a model-independent partial wave analysis, K matrix, are interesting alternatives.

We show the current status of the amplitude analyses of the D decays into three mesons being pursued by the Rio Charm Group at the LHCb experiment.

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