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Decay amplitudes to three hadrons from finite-volume matrix elements

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In this talk, I will review our recent generalization of the Lellouch-Lüscher to study decays to three particles. First, the result in a simplified theory with three identical particles will be presented, and then the generalizations needed to study phenomenologically relevant three-pion decays will be discussed. Specific processes for which this formalism is applicable are the CP-violating $K \to 3\pi$ weak decay, the isospin-breaking $\eta \to 3\pi$ QCD transition, and the electromagnetic $\gamma^* \to 3\pi$ amplitudes that enter the calculation of the hadronic vacuum polarization contribution to muonic g − 2.

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