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Radiative decays of resonances in lattice QCD

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In lattice quantum chromodynamics the electroweak processes that contain resonances in the initial/final states are particularly interesting. Indeed the difficulty is here due to the fact that the resonances do not correspond to the isolated energy levels in the lattice simulations. The main goal is to establish analytically, using effective field theory methods, a connection between a finite volume lattice data and (infinite volume) scattering observables. This will allow to perform an ab initio lattice extraction of the physical quantities, such as the decay rates and form factors. Phenomenologically interesting processes include the $\Delta N \gamma^*$ transition [1] which was studied following this line in [2] and the rare decays $B \rightarrow K^* \gamma^*$ [3].

[1] C. Alexandrou et al., Phys. Rev. B **83** (2011) 014501.

[2] A. Agadjanov et al., Nucl. Phys. B **886** (2014) 1199.

[3] R. Horgan et al., Phys. Rev. D **89** (2014) 094501.

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