

Nucleon resonances in Compton scattering

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The nucleon excitation spectrum has traditionally been at the heart of strong interaction studies. Nucleon resonances and their transition form factors are interesting in a variety of processes: In addition to nucleon-pion scattering and meson photo- and electroproduction, from where they are experimentally extracted, nucleon resonances also appear as intermediate states in nucleon Compton scattering. I present a structure analysis of Compton scattering in general kinematics, which allows one to calculate the resonance contributions to the Compton amplitude and the nucleon's polarizabilities. Gauge invariance and analyticity pose constraints on the general form of the transition currents, which we use to construct fits for the experimental data of $J = 1/2$ and $3/2$ resonances. The transition form factors also encode information on the nonperturbative substructure of resonances and I will highlight progress with Dyson-Schwinger and Bethe-Salpeter equations in calculating them from the level of quarks and gluons.

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