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Forward collisions and spin effects in evaluating amplitudes

Total cross sections and the phases of forward collision amplitudes form part of the early studies when a new energy window becomes available as is provided by the Large Hadron Collider. Enhancement of the forward elastic differential cross section above that expected from estimates of dispersion and optical theorem values may result from the presence of hadronic spin dependence in addition to effects induced by vacuum polarization contributions to the photon propagator. The elastic scattering of protons and ions at small angles is important in the evaluation of the luminosities of the corresponding incident beams and invites detailed examination. Polarization measurements taken at a number of high energies have yielded information on the extent of spin effects in hadronic scattering, particularly at the low momentum transfers related to diffraction.

Primary author: Dr BUTTIMORE, Nigel (Trinity College Dublin)

Presenter: Dr BUTTIMORE, Nigel (Trinity College Dublin)