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Two-photon exchange in proton elastic scattering

JAN C. BERNAUER, Massachusetts Institute of Technology

Recent interest in the proton electromagnetic form factors is partly motivated by the discrepancy found in the determination of the electric-to-magnetic form factor ratio using different techniques. Results from scattering experiments using the Rosenbluth technique indicate that the form factor ratio is constant as a function of Q^2 while experiments employing polarization show a clear, roughly linear, decline of the ratio. A possible explanation is the typically unaccounted for contribution of hard two-photon exchange to the scattering process. Theoretical calculations show large variations, many indicating an effect of the right sign and magnitude. Direct verification was sought by experiments at VEPP-3, Jefferson Lab and by the OLYMPUS collaboration at DESY. In the talk, I will discuss the OLYMPUS experiment and the current state of experimental and theoretical results.