



Contribution ID: 64

Type: **1st and 2nd weeks (Hadron structure and interactions)**

Nucleon polarizabilities, nucleon-pion scattering and pion electroweak production from lattice QCD

Wednesday, October 16, 2024 2:00 PM (1 hour)

I will discuss a lattice QCD calculation of the nucleon electric polarizabilities at the physical pion mass. Our findings reveal the substantial contributions of the $N\pi$ states to these polarizabilities. Without considering these contributions, the lattice results fall significantly below the experimental values, consistent with previous lattice studies. This observation has motivated us to compute both the parity-negative $N\pi$ scattering up to a nucleon momentum of ~ 0.5 GeV in the center-of-mass frame and corresponding $N\gamma^* \rightarrow N\pi$ matrix elements using lattice QCD. Our results confirm that incorporating dynamic $N\pi$ contributions is crucial for a reliable determination of the polarizabilities from lattice QCD. This methodology will also be beneficial for future lattice QCD studies of various lepton-nucleon inelastic scattering processes.

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