

# J/ $\psi$ Near-threshold Quasi-Real Photoproduction at CLAS12

*Thursday, 25 June 2026 12:30 (30 minutes)*

J/ $\psi$  near threshold photoproduction plays a key role in the physics program at the Thomas Jefferson National Accelerator Facility (JLab) 12 GeV upgrade due to the wealth of information it has to offer. J/ $\psi$  photoproduction is predicted to proceed through the exchange of gluons in the t-channel, enabling unique insight about the nucleon mechanical form factors and the nucleon mass radius.

The JLab-based CLAS Collaboration, using the CEBAF Large Acceptance Spectrometer (CLAS12), aims to measure the near-threshold quasi-real J/ $\psi$  photoproduction cross section across a range of targets. Recent measurements on a liquid helium target have studied J/ $\psi$  production on the free proton, enabling estimates of the proton mechanical form factors from the measured cross sections. Measurements on a liquid deuterium target provide the opportunity to compare proton and neutron mechanical form factors and mass radii, through a first determination of cross sections off bound neutrons within the deuteron. CLAS12 has also collected data on a range of heavier nuclear targets, from carbon to lead, which will be used to study possible modifications of the gluon structure of bound nucleons in nuclei. Measurements with a longitudinally polarised target may further clarify the near-threshold production mechanism, crucial for relating J/ $\psi$  production to the gluon structure of the nucleon. Finally, the approved upgrade of CLAS12 to a muon spectrometer ( $\mu$ CLAS12) will enable high-statistics J/ $\psi$  electroproduction at larger quasi-real photon virtualities.

This talk will review recent, ongoing, and proposed measurements of near-threshold quasi-real J/ $\psi$  photoproduction at CLAS12, outlining a coherent research programme to probe the gluon structure of the nucleon.

## Collaboration

CLAS

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