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Precision Measurements of the Electromagnetic Properties of Pseudoscalar Mesons at 11 GeV via the Primakoff Effect LIPING GAN, Hampton University, TJNAF PrimEx Collaboration[1] — We propose to measure the two-photon decay widths, $\Gamma(P \to \gamma\gamma)$, and the transition form factors, $F_{\gamma\gamma^* P}$, where P represents the π^0, η and η' pseudoscalar mesons, via the Primakoff effect. While the measurement of $\Gamma(\pi^0 \to \gamma\gamma)$ will be carried out by an approved experiment (E99-014) at TJNAF, the other measurements (η and η') will become possible with the TJNAF 12 GeV upgrade. The two photon decays of these three neutral pseudoscalar mesons contain fundamental information about two types of the chiral anomalies, and the effects of SU(3) and isospin breaking by the u, d, and s quark masses, which lead to important mixing effects among the mesons. A study of the two-photon decay widths of π^0, η and η' mesons and their transition form factors at very small $Q^2 (\sim 0.001\text{–}0.1\ \mathrm{GeV}^2)$ will allow one to determine the η, η' mixing angle, the size of their electromagnetic interaction radii, and one constant $\mathcal{O}(p^6)$ in the chiral Lagrangian, providing a fundamental test of the confinement scale of QCD. The experimental techniques to be used in the 11 GeV measurements include the low energy recoil detection, zero degree virtual photon tagging, and a high resolution hybrid calorimeter.

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- [X] Prefer Oral Session
- [ ] Prefer Poster Session

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