

(A New Proposal to Jefferson Lab PAC-21)
A Search for Neutral Baryon Resonances
Below Pion Threshold

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Abstract: Possible evidence for neutral baryon resonances at 1004, 1044, and 1094 MeV were reported in pp inelastic scattering data in 1997. We propose using the Hall-A high resolution spectrometer pair to perform coincident $p(e, e' \pi^+) X^0$ measurements with missing mass resolution of 0.5 MeV. We seek to observe abnormal structures in the missing mass spectra in the mass region of $m_N \leq m_{X^0} \leq m_N + m_\pi$. A confirmation of such a structure will raise serious challenges to the existing framework of the quark model. A null result will directly contradict the published evidence, and set a tight upper limit of $\sigma_{p(e, e' \pi^+) X^0} / \sigma_{p(e, e' \pi^+) n} \leq 1.0 \times 10^{-4}$. A total of 120 hours (5 days) of beam time is requested.

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