(A New Proposal to Jefferson Lab PAC-21)

A Search for Neutral Baryon Resonances
Below Pion Threshold

F. Benmokhtar, C. Glashausser, R. Gilman, X. Jiang (Co-spokesperson)*,
G. Kumbartzki, R. Ransome (Co-spokesperson)
Rutgers University, Piscataway, New Jersey.

J.-P. Chen, E. Claudakov, L. Elouadrhiri, D.W. Higinbotham, M. Jones, J. LeRose,
Jefferson Lab, Newport News, Virginia.

D. Margaziotis
California State University, Los Angeles.

P. Markowitz
Florida International University, Miami, Florida.

T.-H. Chang
University of Illinois, Urbana-Champaign, Illinois.

G. Chang, J. Kelly
University of Maryland, College Park, Maryland.

G. A. Peterson
University of Massachusetts at Amherst, Amherst, Massachusetts.

J. Calarco
University of New Hampshire, Durham, New Hampshire.

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 co-
incident \(p(e,e'\pi^+)X^0\) 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.

*Contact person. Email: jiang@jlab.org