Proposal: PR-91-004
Spokesperson: E. Beise

Measurement of Strange Quark Effects using Parity-Violating Elastic Scattering From ^{4}He at $Q^2 = 0.6$ (GeV)^2

and

Proposal: PR-91-010
Spokesperson: P. Souder

Parity Violation in Elastic Scattering From the Proton and ^{4}He

The PAC recommends the conditional approval of parity-violating electron scattering measurements using the pair of HRS spectrometers in Hall A to determine the strangeness electric form factor G_E^s. The PAC feels that considerable progress has been made by the parity community, resulting in the three strong proposals which were presented at PAC5. However, several open questions remain, both on the specific physics to be explored and on the way the experiments will be carried out. In particular, the initial choice of target (^{4}He or ^{1}H) and the optimal kinematics (e.g. momentum transfer) remain to be defined. The PAC would like to see further refinement of the physics arguments which lead to these choices before arriving at a specific recommendation for a first measurement of parity–violating electron scattering at CEBAF.

The PAC feels that precise parity violation measurements for several targets with a broad range of kinematic conditions can be successfully carried out with the HRS spectrometers in Hall A. However, there are a number of open technical questions, including the selection of the mode of data acquisition (integration or digital counting), the determination of possible backgrounds, the development of electron source and beam diagnostics (polarimetry, position monitoring, feedback systems) and target geometry optimization. We would like to see a detailed evaluation of all technical difficulties associated with the operation of the HRS spectrometers at the highest luminosities in their most forward positions. The potential impact of such a difficult experiment in the first few years of CEBAF operation must be more thoroughly evaluated with the Hall A collaboration and laboratory management to ensure mutual understanding of possible scheduling priorities and conflicts.

Whereas the individual experimental groups bring considerable technical expertise to bear on the difficult task of undertaking parity experiments, it is the PAC's perception that the manpower in either of the collaborations alone may not be completely adequate. We strongly encourage the groups interested in measuring G_E^s to combine their intellectual resources and proceed as a unified collaboration. Moreover, we encourage them to strengthen this collaboration by including others who have also expressed interest in parity studies at CEBAF and are not presently a part of the Hall A efforts. Common technical problems should be addressed jointly so that the most effective parity program can be implemented. This will require close cooperation in the collaboration, on the one hand, and management and accelerator groups responsible for polarized electron sources and beamlines, on the other.

The PAC recommends that a PAC/TAP panel be formed which would review in detail all of the technical issues associated with performing parity measurements in Hall A as proposed in PR-91-004 and PR-91-010. The PAC expects that regular progress reports will be made at future meetings and, in particular, following the PAC/TAP technical review a unified plan for an initial G_E^s measurement in Hall A would be presented to the next PAC meeting. It is preferable that the collaboration arrive at a jointly agreed upon choice of target, kinematics and technique (including a common detector package) for the initial experiment. However, if the groups involved cannot arrive at such a plan for presentation to the PAC, then the PAC may have to recommend the assignment of initial priority based on the present proposals.

Recommendation

The PAC recommends that this experiment be conditionally approved for Hall A.