Review #2

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| **Proposal Number:** | 1229424 |
| **NSF Program:** | Major Research Instrumentation |
| **Principal Investigator:** | Horn, Tanja |
| **Proposal Title:** | MRI Consortium: Development of a Neutral Pion Detection System for Hall C at 12 GeV JLab |
| **Rating:** | Very Good |

**REVIEW:**

What is the intellectual merit of the proposed activity?
Strengths

The proposal is to construct a new Pi-0 detector to be used in the JLab Hall C neutral pion research program at 12 GeV. The instrument will be used in exclusive and semi-inclusive measurements aiming to help to clarify the factorization of hard and soft (short and long distance) interactions of the struck parton and resudual hadron. The theoreical aspect of this program is accomplished through the study of Generalized Parton Distributions (GPDs). This is one of the central lines of research in contemporary nucleon physics. The proposed instrument would add significantly to this program.

The PI, as well as the collaborating groups, are well qualified to conduct the project. The design is well thought through, and builds largely on prior experience with similar detectors at JLab and elsewhere. The support of JLab will ensure that infrastructure resources essential for completing the project will be available. The
proposal makes good use of existing detector modules.

Weaknesses

There are really no weaknesses of note to this proposal.

What are the broader impacts of the proposed activity?
Strengths

Besides contributing to the program of GPD study outlined above, the most important broader impact of this proposal will be in teaching and training undergraduate and graduate students, as well as junior researchers. The results of the research will be broadly disseminated through journal publications, and will contribute to the development of this field of instrumentation. The PI is committed to promoting diversity in her research and training.

Weaknesses

None.

Program Specific Criteria

For instrument and development proposals: 1) the adequacy of the management plan; 2) the availability of appropriate technical expertise to design and construct the instrument; 3) the appropriateness of the cost of the new technology; 4) the need for development of a new instrument.

Comments on both strengths and weaknesses

The management plan includes sufficient infrastructure and technical expertise to allow effective usage of the instrument. The combination of expertise from the collaborating groups provides a positive synergy. To this reviewer, the proposed operation and maintenance costs appear to be justified and reasonable in magnitude. The technology proposed for the instrument is well developed and mature. Its cost is well understood and reasonable.

Summary Rationale for the Rating

This is a cost-effective proposal, making use of existing equipment and expertise to construct an attractive new device. The Pi-0 spectrometer will be used in a range of measurements at JLab, beyond the initial program outlined by the PI. The instrument provides a unique neutral meson detection capability, well complementing existing JLab magnetic spectrometers. The physics addressed lies at the core of the present US and worldwide nucleon research program.