

1 Budget Justification

We request a budget of \$516,529 in direct costs (\$774,793 in total direct plus indirect costs) over the three-year grant period. This would support

- One experimental postdoc to lead the technical analysis effort. This postdoc would identify the existing replayed CLAS data, together with all the appropriate existing cuts and corrections in phase one (see Section 2.4 of the proposal) and make that available to the other members of the collaboration. In phase two, the postdoc would organize and provide the necessary technical leadership to develop new analysis tools and repeat the low-level analysis of the most promising data.

This is the crucial position to provide the technical expertise and leadership for the data analysis effort. In order to analyze the data in a timely manner, this must be a full-time, dedicated postdoctoral position. This postdoc will be hired at the beginning of year one of the grant period. This postdoc will be hired by Old Dominion University and will be stationed at Jefferson Lab.

- One additional graduate student to help with the data analysis. This graduate student will work under the supervision of the experimental data mining postdoc and the senior staff. He or she will help develop analysis tools, perform low-level analysis of the data, and perform physics analysis of the data. This graduate student will be hired by The College of William and Mary.
- Starting in the second year of the project when the main part of the data cooking is completed it will be critical to have the full time involvement of a theoretical postdoc in order to produce high precision interpretation of the data.

The theoretical support needed for successful completion of the project includes modeling of the physics processes and their competing effects (e.g., studies of the break up of short-range correlations, production and interactions of Δ -isobars, together with a detailed model of the final state interaction effects, etc) and preparing these models in the form of physics event generators for Monte Carlos analysis of the data. This highly technical task requires an expertise on the level of a postdoc with a strong background in the field of high energy nuclear physics.

We plan that the theory postdoc will work in close collaboration with Mark Strikman (PSU) and Misak Sargsian (FIU).

A detailed description of the required funds follows:

1.1 Salaries and Wages

- Graduate Research Assistants (one GRA starting in year 2)

Graduate Research Assistant (GRA) wages are based on a 12 month performance period. A GRA may devote 50% academic year effort and 100% summer effort to the project each year. Specific wage rates are determined by the academic department based on the level of the student (masters or doctoral student) and experience on research and sponsored projects. The wage rate for the GRA on this project is \$24,000. A 5% salary increase has been projected for the GRA each year.

- Postdoctoral Research Associate

The salary for a Postdoc is \$46,000 in year 1, with 5% raises in years two and three.

1.2 Fringe Benefits

(ONR negotiated rate dated June 18, 2009)

- Post Doctoral Associate

FICA, unemployment insurance, worker's compensation, health, dental, life, and disability insurance premiums, annual and sick leave premiums have been budgeted for this position in accordance with current Old Dominion University Research Foundation policies.

- Graduate Research Assistant

FICA, workers compensation and unemployment insurance premiums have been budgeted for the summer salary of the Graduate Research Assistant. Only worker's compensation has been budgeted on academic year salary.

1.3 Travel

Domestic travel funding of \$22,500 per year is requested for the members of the data mining collaboration to attend the biannual collaboration meetings and to attend professional and research conferences to discuss and present results of this research. The amount of \$7,500 in foreign travel is similarly requested for the foreign members of the collaboration to attend the biannual collaboration meetings.

1.4 Indirect Costs

Our ONR negotiated agreement dated July 22, 2009 authorizes an on-campus indirect cost rate of 50% of modified total direct costs effective July 1, 2009 until amended.