FLORIDA STATE UNIVERSITY

Questions Answered

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- NSF Site Visit, John D. Fox Laboratory, Florida State University

Questions from the Committee

1) Please provide the justification for the requested postdoc

We request support for one Post-Doctoral Scholar, each year for 12 months. This scholar will pursue a research program using the Clarion-2 array and support the experimental campaigns with it and also add new capabilities as needed.

Based on the interest expressed by several groups during the CLARION-2 workshops held at the LECM22 and 23, we anticipate increased external use of CLARION2 in the coming years. Examples: Ben Crider(MsState), Peter Bender (UMass Lowell), Robert Kay(, Elizabeth McCutchan(BNL), Claus M.-Gatermann(ANL). The new post doc will facilitate these experiments. In the past two years the Clarion-2 campaign benfitted from 2 post docs, one from ORNL (T. Gray) and the other from FSU (Soumik B.), both playing major development / operations role for Clarion-2-TRINITY. With Clarion-2 established, operation support will be taken over by FSU postdoc.

The postdoc will also perform equipment and method development: Adding Silicon detectors to Trinity, developing (3He,n) gamma-ray spectroscopy program and angular correlation / polarization analysis.

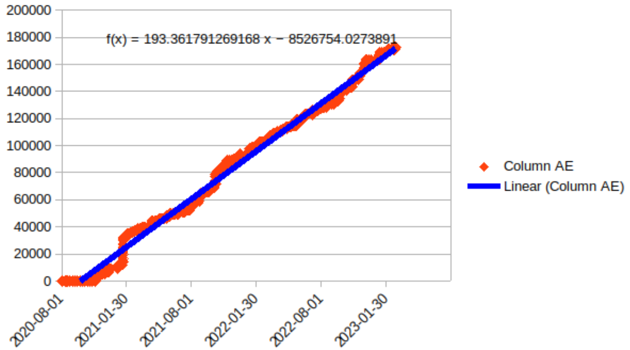
The CLARION2-TRINITY setup is an excellent and versatile setup for the scholar to explore many scientific questions. One likely direction is spectroscopy in the upper "fp" shell nuclei exploring further the role of g9/2 orbital. Working with this setup and various groups will be great for their professional development

Questions from the Committee

2) Please provide more information on the supplies listed under G1“Other” and give the basis of estimate.

In estimating the materials and supplies, we separate cryogenic cost for two cryo (linac) campaigns of 2000 hours per year.
2a) The LN2 cost is calculated assuming 208 days of cryo operation per year, LN2 cost during liquid-helium operation are estimated at 300$/day and 150$/day without liquid-helium. This analysis is based on 2020-2023 accounting records of LN2 deliveries analyzed wrt whether the helium liquefier is on or off.

Graph shows the accumulating LN2 cost 2020-2023.
3 Cryo periods: 2020, 2021, 2022,



Questions from the Committee

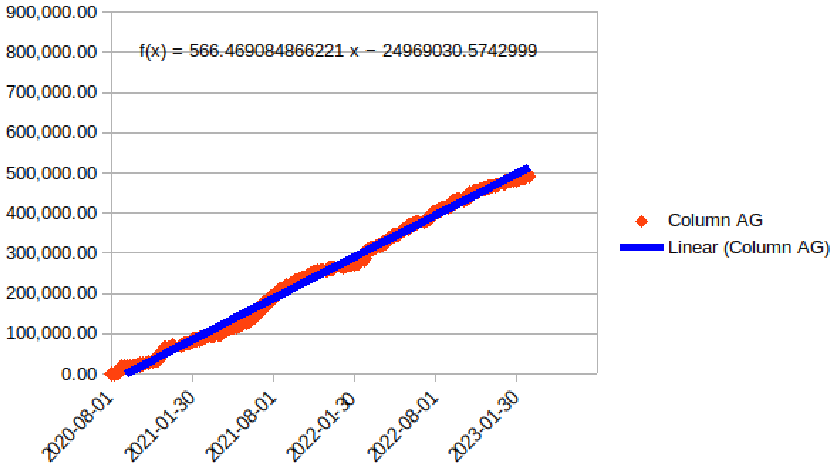
2) Please provide more information on the supplies listed under G1“Other” and give the basis of estimate.

2b) The Helium cost is calculated assuming 2 warm-up periods per year.
Analysis of helium orders show that the cryogenic system loses about 21000 ccf per warmup (ccf = centi-cubic-feet)
42000 ccf correspond to $40.4 k, $42.3 k, $44.5k and $46.5 k using the current Messer Inc. delivery contract prices for years 1-3. Contract will be re-negotiated in year 4, likely to be at least 2* what is assumed here.

Questions from the Committee

1) Please provide more information on the supplies listed under G1"Other" and give the basis of estimate.

2c) The remaining, non-cryo related materials and supplies cost are estimated from the accounting records 2020-2023, which amount to an average of 566$ / day. Inflation is assumed at 5%, arriving at $216.9k, $227.8k, $239.2k and $251.1k for years 1-4.



Questions from the Committee

3) Does the requested budget include the materials and operation of the triton beam?

No, the "tritium-specific" funds for the tritium source operation are covered on the NNSA grant. This includes the tritium cathode manufacturing and disposal, vacuum systems / interlock hardware and the funds for the associated UTK Postdoc.

NSF supports Senior Research Associate B.Schmidt, whose main assignment is operation of the Tandem and the Ion sources.
He plays a supervisor and advisor role to the UTK Postdoc.
The general operation cost of the laboratory is supported by NSF, also while it delivers tritium beams

Questions from the Committee

4) What local organization or policy is used in determining beam allocation?

The beam time is allocated approximately quarterly, in discussions between the six Co-PI and the scientific personnel. The proposals are assessed for their technical feasibility and scientific merit. Goal is to allocate beam time by consensus, while the final responsibility is with the PI.

Scheduling is performed with the goal of optimizing the efficiency and effectiveness of lab operations, grouping campaigns of experiments with the same equipment together, as well as optimizing the linac cryogenic operation.

Priority in beam time allocation and scheduling is given to graduate student projects, under consideration of timely graduation.
Priority is given to external users who have a shared responsibility for experimental equipment.

Questions from the Committee

5) How are grad students trained for accelerator operations?

Training is provided as students are joining the group or external users prepare to work at the lab. Training is provided in several components:

a) A course on General Radiation Safety, provided at the FSU Rad Safety office. (Renewed bi-annually)

b) A presentation and practical exercise of Accelerator Safety procedures and regulations, provided at the Fox Lab by the I.W.

c) Presentation and Hands-on training on Ion Sources and Tandem beams by B. Schmidt

d) Presentation and Hands-on training on Linac operations by D. Spingler

We are working to improve this training process by adding more theoretical context and expanding the practical beam-development training.

Questions from the Committee

6) How many undergraduate students (from any university) do you expect to be involved in research at the lab in the coming years?

Per year:
FSU: 6-8, about 3 with thesis-level projects
5-6 outside of FSU.