

Report Title: ERCAP Requests Details
Run Date and Time: 2021-09-30 04:24:39 Pacific Daylight Time
Run by: PDF Generator User
Table name: u_ercap_requests

ERCAP Requests

This request is a renewal.:	true		
ERCAP Number of Request to Renew:	ERCAP0016953		
ERCAP Number:	ERCAP0020327	Allocation Year:	2022
Project Title:	Analysis and Simulation for the GlueX Detector	State:	Draft
Label:	GlueX	Revisions required:	
PI Name:	Lawrence, David (davidl)	Rejection Reason:	
PI Name Company:	Jefferson Lab	Project Class:	
PI Name Email:	davidl@jlab.org	Program:	NP - Nuclear Physics
PI Name Business phone:	7572695567	Sub Program:	
		Science Category:	Physics : Nuclear Physics (Experimental)
		Project:	m3120

Personnel

Senior Investigators:
 Mark Ito
 David Lawrence
 Alexander Austregeslio

Authorized Preparers:
 Lawrence, David (davidl), Larrieu, Christopher (larrieu), Brei, Nathan (nbrei), Jaegle, Igal (ijaegle), Austregesilo, Alexander (aaust)

Funding

DOE Office of Science (SC):
 true

Funding Office:
 DOE Office of Science Nuclear Physics (NP)

Funding Program Manager:
 Rai, Gulshan (Gulshan.Rai@science.doe.gov)

DOE/SC Grant, PAMS, FWP numbers:
 Contract number DE-AC05-06OR23177

Federal Agency other than DOE/SC:
 false

Other Funding/Agency Source(s):

Other Federal Agency grant numbers:

LDRD Funding:
 false

Funding Laboratory:

LDRD grant numbers:

State or local government or agency:

false

State/Local Govt/Agency name and grant numbers:

Foreign Government or Agency:

false

Foreign Government/Agency name and grant number:

University:

false

University name and grant numbers:

Non-profit Organization:

false

Non-profit Organization and grant number:

Other:

false

Other organizations and grant numbers:

Office of Science relevance:

Security

I attest that this project adheres to these guidelines. : true false

I request an exception to these policies, based on the following:: false

Please Explain Policy Exception:

Project Details

Project Summary and Goals:

The primary project goal will be to analyze data taken with the GlueX detector from a set of ongoing nuclear physics experiments at the Jefferson Lab accelerator. The analysis will consist of extracting timing and energy deposition information from the data in order to reconstruct individual particle interaction events. The analysis will produce the momentum, direction, and type (particle ID) of each particle detected in each reaction. The statistics of these reaction particles can then be used to measure fundamental physical properties of the excited states of the target + photon system, leading to an understanding of the underlying particles (quarks and gluons) and the forces among them.

Detailed Description for DOE Managers:

We plan to perform the first stage reconstruction of the data from the GlueX experiment at NERSC. This will require transferring the raw experimental data from JLab to NERSC, producing the "data summary tapes" (DST) files, and transporting them back to JLab for further analysis. Our current plan is to try and focus larger scale full passes over the data at NERSC allowing us to use our time on the local JLab cluster for the smaller campaigns that require quick turn around. The NERSC jobs will do the most CPU intensive part of the analysis. Specifically, charged particle tracking, calorimeter cluster finding, and matching reconstructed objects between detectors.

Website URL:

https://halldweb.jlab.org/wiki/index.php/GlueX_Project_Overviews

Accomplishments Summary:

Numerous talks in 2020 and 2021 at conferences and workshops. Nearly all are based on data that was at least partially processed at NERSC. For a list, please see here:

https://halldweb.jlab.org/wiki/index.php/GlueX_Talks

The GlueX experiment at the Thomas Jefferson National Accelerator Facility is part of a global effort to study the properties of the strong interaction, which binds the fundamental quarks into subatomic particles like protons and neutrons. In 2018, the experiment completed its initial phase, recording a worldleading data set of more than 250 billion events which corresponds to about 5 petabytes of raw data. Given the limited local resources, the collaboration depends on HPC farms like NERSC to condense this massive data sample into physical quantities like particle trajectories and electromagnetic showers. About two thirds of this initial data set were processed at NERSC, and the elaborate analysis is presently ongoing. We expect several high-impact publications to emerge from this program.

In parallel, the experimental setup was upgraded for the second phase of GlueX. From Spring 2020 onward, GlueX is taking data with a considerably higher rate, opening the door for the exploration of rare processes. Within the first few months, we have essentially doubled the data set and have already started to employ NERSC resources for its reconstruction campaign. We invested manpower to optimize the usage and are planning to continue this successful collaboration for the next few years.

Refereed Publications:

We have >4 Nuclear Physics publications under development that use NERSC processed data that we expect to be published within the next year.

Non-refereed materials:

Resources

CPU Node Hours Used: 59,937,562 CPU Node Hours Requested: 250,000

GPU Node Hours Used: 0 GPU Node Hours Requested:

GPU Readiness:

Archival Storage Used (TB): 0 Archival Storage Requested (TB): 1

CFS Storage Used (TB): 0 CFS Storage Requested (TB): 500

Justification for Request:

Values are calculated based on GlueX Computing model. Model is implemented in a Python script using input from XML files representing different data sets. Both can be found here:

https://github.com/JeffersonLab/hd_utilities/tree/master/comp_mod

The file RunPeriod-2017-01-reprocess.xml contains extensive comments detailing how numbers that are input to the model were determined. For the coming year we plan to reprocess the 2017 data which accounts for 158k of the 250k request. The remaining 92k will be used to process the smaller 2021 data sets currently being gathered for the PrimEx and Short Range Correlations experiments using the GlueX detector.

Key Events or Deadlines:

Need real-time computing?:

false

Explanation for Realtime Computing Needs:

Experimental or Observational project?:

true

Special Requirements:

Codes

Please tell us about your most used/important codes (select up to 5):

2

Code 1 Name:

JANA

Code 1 URL:

<https://www.jlab.org/JANA/>

Code 1 Description:

GlueX data analysis

Code 1 is GPU Enabled?:

false

Code 2 Name:

Hall-D Reconstruction Code

Code 2 URL:

https://github.com/JeffersonLab/hall_d_recon

Code 2 Description:

Reconstruction of GlueX data

Code 2 is GPU Enabled?:

false

Code 3 Name:

Code 3 URL:

Code 3 Description:

Code 3 is GPU Enabled?:

false

Code 4 Name:

Code 4 URL:

Code 4 Description:

Code 4 is GPU Enabled?:

false

Code 5 Name:

Code 5 URL:

Code 5 Description:

Code 5 is GPU Enabled?:

false

Supporting Information

Other HPC Support:

We have also been granted a smaller XSEDE award for project PHY190032 of 2.33M core-hours starting in July 2021. That has already been exhausted. We may submit another request for an additional allocation at PSC through XSEDE, but will not do that before the next quarter. Some portion of the data will also be processed on the JLab SciComp farm (modest by comparison to NERSC).

Additional Information:

Feedback:

I will again complement you on the user-friendly request form that makes it relatively painless to put together and submit allocation requests. The NERSC system is a much better experience than XSEDE's.

Usage Agreement

Usage Agreement Initials:

DL

Award Information

Approval State:	
Not Yet Requested	
CPU Node Hours Requested:	250,000
GPU Node Hours Requested:	
Archival Storage Requested:	1
CFS Storage Requested:	500
CPU Node Hours Awarded:	
GPU Node Hours Awarded:	
Archival Storage Awarded (TB):	1
CFS Storage Awarded (TB):	
DOE PM Notes:	
Approver:	
Award Status:	
Draft	

Record History

Computational Repo:	m3120	Project ID:	61031
Computational Current Allocation:	74,000,000	Archival Current Quota (TB):	1
Computational Repo ID:	61032	Archival Repo ID:	61033
GPU Account:	m3120_g	HPSS Only:	false
GPU Current Allocation:	0	Current Project Storage Quota (TB):	535
GPU Account ID:	67592	CFS Max Projdirs:	10
Renewed by ERCAP Request:		CFS Max Files:	20,000,000
AY Year Start:	January 19, 2022	Sponsoring Organization:	Jefferson Lab
AY Year End:	January 17, 2023	Does PI work at a federal agency or national lab?:	true

Related List Title: Attachment List
Table name: sys_attachment
Query Condition: Table name = u_ercap_requests AND Table sys ID = e40cd17e1bf2bc10f6a720ebe54bcb60
Sort Order: Created in descending order

None