

## Plan Overview

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*A Data Management Plan created using DMPTool*

**Title:** The Nucleon Axial-Vector Form Factor at the Physical Point with the HISQ Ensembles

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**Funder:** United States Department of Energy (DOE) ([energy.gov](http://energy.gov))

**Funding opportunity number:** 39940

**Template:** Department of Energy (DOE): Office of Science

### Project abstract:

We propose to continue our computation of the axial-vector form factor of the nucleon using the highly-improved staggered-quark (HISQ) action for both valence and sea quarks. We use the (2+1+1)-flavor HISQ ensembles generated at the physical point, combining lattice QCD calculations of the  $q^2$  dependence with the  $z$  expansion to obtain a model-independent description of the shape. With previous support from USQCD, we have computed the axial charge  $g_A$  directly at the physical point and tested our approach by reproducing the baryon number  $g_V$  (obtaining 1 after renormalization). We now focus on the shape of the axial and vector form factors, the latter of which is constrained by high-statistics electron-scattering data. The project is well aligned with USQCD goals, because the axial-vector form factor is an important ingredient in quasielastic neutrino-nucleon scattering, which is the key signal process in neutrino-oscillation experiments at Fermilab.

**Last modified:** 04-04-2022

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# The Nucleon Axial-Vector Form Factor at the Physical Point with the HISQ Ensembles

For this project there are three classes of data that are being generated:

1. Staggered point-source propagators on  $a=0.12\text{fm}$  and potentially on  $0.09\text{fm}$  MILC ensembles.
2. Two- and three-point correlator data on the above ensembles, including metadata.
3. Plotted data used in figures and tables for publications using the data given in 1) or 2).

Preservation:

1. Propagator data be only kept temporarily during the campaign as it is too large and expensive to store longer term.
2. The unaveraged correlator data - including metadata - will be kept in sqlite3 databases (a standard format accepted as future proof by office of science). This data will stored on disk where USQCD gives storage as part of our allocation for the duration of the project. After the project has met it's goals and finished, the data will be kept an additional 3-5 years on disk. Fermilab will provide long-term tape storage of the nucleon data as well as analysis results that go into publications since it is the home institution of several collaborators on this project.
3. The plotted data will be submitted to [HEPdata.net](https://hepdata.net) and or kept in sqlite3 databases and will follow the same preservation plan as data in 2).

Sharing:

1. NA
2. The unaveraged correlator data in sqlite3 databases - including metadata - will be made available upon request as soon as the time of publication. The publication will indicate this.
3. Identical to data in 2).

Management:

- The management of the data will fall under the remit of the PI of this grant, and if the PI changes then the subsequent PI will take over management also.

Addressed in Section 1.

- All preserved data will be made publicly available at the time of publication, if not before.
- All data will be in standard format: correlator and results/figures/tables in sqlite3 database.

All resources (FNAL/BNL tape and disk storage) are under the control the USQCD executive committee and so we do not require additional permissions to hold propagators or databases at such facilities. The Fermilab Lattice and MILC collaboration's overall data management plan is available online: [DMP\\_FNAL\\_MILC.pdf](#)

No data breaches any confidentiality or pose any security issues for the U.S., or any associated facility.

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