# Accelerating SBNFit Fitting Framework on HPC

## Scientific Achievement

**Accelerating SBN application and algorithms that calculate Feldman-Cousins corrections used in the sterile-neutrino search to run efficiently on HPC facilities**

## Significance and Impact

**Transforms a memory-limited serial-execution program into an MPI-parallel application that scales up to available compute power of a facility. Factor of 350 single-core speed up from original implementation**

## Research Details

- Native built of SBNFit application at NERSC to take advantage of specific acceleration hardware
- Algorithms leverage vectorization through Eigen3 yielding a factor of 350 single-core speed up compared to the original implementation
- MPI node-level and thread-level parallelism through DIY and HDF5 using input data and covariance matrix from SBN.
- HDF5 in conjunction with HighFive to write results of the calculation to file.