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Accelerating Feldman-Cousins on NOvA using NERSC Supercomputers

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When fitting to data with low stats and near physical boundaries, extra measures need to be taken to ensure proper statistical coverage. The method NOvA uses is called the Feldman-Cousins procedure, which entails fitting thousands of independent pseudoexperiments to generate acceptance intervals that are then used to correct our fits. The scale required by the Feldman Cousins procedure makes it extremely computationally intensive. In past analyses, it has taken up to several weeks to complete, bottlenecking our final results. Here I present recent work by members of the NOvA experiment and the SciDAC4 collaboration to enable the use of the super-computing facilities at NERSC to process our Feldman-Cousins corrections over 150x faster, allowing us to do more studies, increase the precision of our fits, and produce results quickly.

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