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**Efficient Neutrino Oscillation Parameter Inference with Gaussian Process** YIWEN XIAO, NITISH NAYAK, LINGGE LI, JIANMING BIAN, PIERRE BALDI, University of California, Irvine — The unified approach of Feldman and Cousins allows for estimating confidence intervals for datasets with small statistics that commonly arise in high energy physics. It has gained widespread use, for instance, in measurements of neutrino oscillation parameters in long-baseline experiments. However, the approach is computationally intensive as it is typically done in a grid-based fashion over the entire parameter space. In this talk, I will discuss a more efficient algorithm for the Feldman-Cousins approach using Gaussian processes to construct confidence intervals iteratively. I'll show that in the neutrino oscillation context, one can obtain confidence intervals fives times faster in one dimension and ten times faster in two dimensions, while maintaining an accuracy above 99.5%. I'll also discuss next steps related to the implementation in the NOvA FC framework at NERSC.

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