

DNP19-2019-000011

Abstract for an Invited Paper
for the DNP19 Meeting of
the American Physical Society

Chisquare Fitting When Overall Normalization is a Fit Parameter

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Problems with the use of the χ^2 method to fit an event histogram when the total expected number of events is not fixed, keep appearing in experimental studies. It appeared in our MiniBooNE experiment. It was named Peelles Pertinent Puzzle (PPP) in Britain. This puzzle was also found in a NIM article in 1994 by an Italian physicist who has made some major contributions to statistics used by physicists. The puzzle is that in a χ^2 fit, if overall normalization is one of the parameters to be fit, the fitted curve may be seriously low with respect to the data points, sometimes below all of them. This problem and the solution for it are well known within the statistics community, but, apparently, not well known among some of the physics community. The purpose of this talk is didactic, to explain the cause of the problem and the easy and elegant solution.