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Method of Moments Applied to the Analysis of Precision Spectra from the Neutron Time-of- flight Diagnostics at the National Ignition Facility[1] ROBERT HATARIK, J. A. CAGGIANO, D. CALLAHAN, D. CASEY, D. CLARK, T. DOEPPNER, M. ECKART, J. FIELD, Lawrence Livermore National Laboratory, J. FRENJE, M. GATU JOHNSON, Massachusetts Institute of Technology, G. GRIM, E. HARTOUNI, O. HURRICANE, J. KILKENNY, Lawrence Livermore National Laboratory, J. KNAUER, Laboratory for Laser Energetics, T. MA, O. MANNION, D. MUNRO, D. SAYRE, B. SPEARS, Lawrence Livermore National Laboratory — The method of moments was introduced by Pearson as a process for estimating the population distributions from which a set of "random variables" are measured. These moments are compared with a parameterization of the distributions, or of the same quantities generated by simulations of the process. Most diagnostics processes extract scalar parameters depending on the moments of spectra derived from analytic solutions to the fusion rate, necessarily based on simplifying assumptions of the confined plasma. The precision of the TOF spectra, and the nature of the implosions at the NIF require the inclusion of factors beyond the traditional analysis and require the addition of higher order moments to describe the data. This talk will present a diagnostic process for extracting the moments of the neutron energy spectrum for a comparison with theoretical considerations as well as simulations of the implosions.

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