Abstract Submitted
for the DNP19 Meeting of
The American Physical Society

Yields of weakly-bound light nuclei as a probe of the statistical hadronization model YUKARI YAMAUCHI, YIMING CAI, THOMAS COHEN, University of Maryland, College Park, BORIS GELMAN, New York City College of Technology, The City University of New York — The statistical hadronization model is a simple and efficient phenomenological framework in which the relative yields for very high energy heavy ion collisions are essentially determined by the chemical freeze-out temperature. Recent measurements of yields of hadrons and light nuclei from the ALICE collaboration at the LHC were described by the model with remarkable accuracy with a chemical freeze-out temperature of 156.5 $\pm$ 1.5 MeV. A key physical question is whether the freeze-out temperature can be understood as the temperature at which the various species of an equilibrated gas of hadrons (including resonances) and nuclei chemically freeze out as the model assumes, or whether it successfully parametrizes the yield data for a different reason. The analysis of the yields of weakly-bound light nuclei indicates that a key assumption underlying the model—that hadrons (and nuclei), just prior to chemical freeze-out temperature, are in thermal equilibrium and are sufficiently dilute as to have particle distributions accurately described statistically by a nearly ideal gas of hadrons and nuclei with masses given by their free space values — appears to be inconsistent with the chemical freeze-out temperature output by the model, at least for these weakly-bound light nuclei.

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Date submitted: 01 Jul 2019 Electronic form version 1.4