

Abstract Submitted  
for the DNP06 Meeting of  
The American Physical Society

**Primordial Element Synthesis Calculations with the bigbangonline.org Software Suite** M.S. SMITH, E.J. LINGERFELT, J.P. SCOTT, W.R. HIX, C.D. NESARAJA, ORNL Physics Division\*, G.M. FULLER, D. TYTLER, Univ. California San Diego, L.F. ROBERTS, Colorado College — Predictions of the abundances of  $^2\text{H}$ ,  $^4\text{He}$ , and  $^7\text{Li}$  synthesized three minutes after the Big Bang can be compared with abundances inferred from observations to constrain the total amount of baryonic matter in the Universe, the number of  $\nu$  species, and other cosmological parameters. These constraints can be compared to those derived from measurements of the cosmic microwave background. A new online suite of computer codes has been developed at **bigbangonline.org** to facilitate custom big bang nucleosynthesis (BBN) calculations. Users of this freely available system can specify the latest set of input thermonuclear reaction rates and cosmological parameters to set up their simulation, and the latest primordial abundance observations to determine their constraints. Monte Carlo BBN simulations [1] are also enabled, where uncertainties of the input reaction rates are propagated into uncertainties of the cosmology constraints. The suite features excellent visualization tools and enables sharing of simulation results between Users. Features of the suite and its utilization in a new set of BBN calculations will be presented.

[1] M.S. Smith et al., Ap. J. Suppl. 85 (1993) 219.

\*Managed by UT-Battelle, LLC, for the US D.O.E. under contract DE-AC05-00OR22725.

Michael Smith  
Physics Division, ORNL

Date submitted: 30 Jun 2006

Electronic form version 1.4