Relativistic Continuum Shell Model JANINA GRINEVICIUTE,
DEAN HALDERSON, Western Michigan University — The R-matrix formalism
of Lane and Thomas[1] has been extended to the relativistic case so that the many-coupled channels problem may be solved for systems in which binary breakup channels satisfy a relative Dirac equation. The formalism was previously applied[2] to
the relativistic impulse approximation (RIA) and now we applied it to Quantum
Hadrodynamics (QHD) in the continuum Tamm–Dancoff approximation (TDA)
with the classical meson fields replaced by one-meson exchange potentials. None of
the published QHD parameters provide a decent fit to the $15N + p$ elastic cross
section. The deficiency is also evident in inability of the QHD parameters with
the one meson exchange potentials to reproduce the QHD single particle energies.
Results with alternate parameters sets are presented.

[1]A. M. Lane and R. G. Thomas, *R-Matrix Theory of Nuclear Reactions*, Reviews of
Modern Physics, **30** (1958) 257
[2]J. Grineviciute and Dean Halderson, *Dirac Oscillators and the Relativistic R Matrix*, Phys. Rev. C **80** (2009) 044607

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