

Abstract Submitted
for the DNP08 Meeting of
The American Physical Society

Ab initio many-body calculations of nucleon scattering on ^{16}O
PETR NAVRATIL, SOFIA QUAGLIONI, LLNL, ROBERT ROTH, TU Darmstadt — We develop a new *ab initio* many-body approach¹ capable of describing simultaneously both bound and scattering states in light nuclei, by combining the resonating-group method² with the *ab initio* no-core shell model (NCSM).³ In this way, we complement a microscopic-cluster technique with the use of realistic interactions, and a microscopic and consistent description of the nucleon clusters, while preserving Pauli principle and translational symmetry. We will present results for low-energy nucleon scattering on ^{16}O and for $A = 17$ bound states obtained using realistic nucleon-nucleon potentials. The ^{16}O wave functions are calculated within the importance-truncated NCSM⁴ that allows the use of model spaces up to $\approx 18\hbar\Omega$ and ultimately enables to reach convergence of phase-shifts and other observables. Prepared by LLNL under Contract DE-AC52-07NA27344. Support from the U.S. DOE/SC/NP (Work Proposal No. SCW0498), and from the U. S. Department of Energy Grant DE-FC02-07ER41457 is acknowledged.

¹S. Quaglioni and P. Navratil, arXiv:0804.1560.

²Y. C. Tang *et al.*, Phys. Rep. **47**, 167 (1978); K. Langanke and H. Friedrich, Advances in Nuclear Physics, Plenum, New York, 1987.

³P. Navratil, J. P. Vary, and B. R. Barrett, Phys. Rev. Lett. **84**, 5728 (2000); Phys. Rev. C **62**, 054311 (2000).

⁴R. Roth and P. Navratil, Phys. Rev. Lett. **99**, 092501 (2007).

Petr Navratil
LLNL

Date submitted: 07 Jul 2008

Electronic form version 1.4