Abstract Submitted
for the DNP11 Meeting of
The American Physical Society

Analysis of Fusion Reactions with Carbon Isotopes[1] HENNING ESBENSEN, Argonne National Laboratoty, CHENG-LIE JIANG, Argonne National Laboratory, XIAO-DONG TANG, University of Notre Dame — Fusion data for ^{13}C+^{13}C are analyzed by coupled-channels calculations that are based on the M3Y+repulsion, double-folding potential. Quadrupole and octupole transitions to low-lying states in projectile and target are included, as well as mutual excitations of these states. The one-neutron transfer to the ^{12}C+^{14}C mass partition is also considered. By adjusting the parameters of the M3Y+repulsion interaction it is possible to obtain an excellent fit to the data. This requires, however, that the absolute normalization of the calculation is adjusted, and justifications for doing that are discussed. The calibrated M3Y+repulsion interaction is applied to predict the fusion cross section for ^{12}C+^{13}C and good agreement with the data is achieved. The prediction for ^{12}C+^{12}C is in reasonable agreement with the maximum peak cross sections that have been measured, and provides an upper limit for the extrapolation to the low energies that are of interest to astrophysics.

[1]Work supported by the U.S. Department of Energy, Office of Nuclear Physics, under Contract No. DE-AC02-06CH11357. XT is supported by NSF, Grant No. PHY-0758100 and PHY-0822648, and the National Natural Science Foundation of China, Grant No. 11021504.

Henning Esbensen
Argonne National Laboratory

Date submitted: 01 Jul 2011 Electronic form version 1.4