

Abstract Submitted
for the DNP10 Meeting of
The American Physical Society

Coupled-channels Calculations of Heavy-ion Fusion Reactions¹

HENNING ESBENSEN, Physics Division, Argonne National Laboratory — Heavy-ion fusion reactions are sensitive probes of the nuclear surfaces of the reacting nuclei. Roughly speaking, the height of the Coulomb barrier in the entrance channel is determined by the surface density profiles of the two nuclei, and the couplings to low-lying surface modes are responsible for lowering the effective barrier and enhancing the fusion cross section at sub-barrier energies. However, it is difficult to accurately predict the fusion cross from coupled-channels calculations, partly because of the influence of the polarization of high-lying states that are not considered explicitly, and partly because of transfer reactions in asymmetric collisions. These features are illustrated by analyzing new data for the fusion of symmetric and asymmetric combinations of calcium isotopes, and it is discussed how they affect the extrapolation of fusion cross sections to extreme sub-barrier energies.

¹Work supported by the U.S. Department of Energy, Office of Nuclear Physics, under Contract No. DE-AC02-06CH11357.

Henning Esbensen
Physics Division, Argonne National Laboratory

Date submitted: 29 Jun 2010

Electronic form version 1.4