EPJ Web of Conferences **117**, 08006 (2016) DOI: 10.1051/epjconf/201611708006
NN2015

Systematic study of quasifission characteristics and timescales in heavy element formation reactions

D.J. Hinde[1], E. Williams, G. Mohanto[2], C. Simenel, M. Dasgupta, A. Wakhle[3], I.P. Carter, K.J. Cook, D.Y. Jeung, D.H. Luong, C.S. Palshetkar[4], E. Prasad, D.C. Rafferty, R. du Rietz[5] and E.C. Simpson

Department of Nuclear Physics, Research School of Physics and Engineering, Australian National University, ACT 2601, Australia

Abstract

Superheavy elements can only be created in the laboratory by the fusion of two massive nuclei. Mass-angle distributions give the most direct information on the characteristics and time scales of quasifission, the major competitor to fusion in these reactions. The systematics of 42 mass-angle distributions provide information on the global characteristics of quasifission. Deviations from the systematics reveal the major role played by the nuclear structure of the two colliding nuclei in determining the reaction outcome, and in hindering or favouring heavy element production.

To form very heavy and superheavy elements (SHE), heavy-ion fusion reactions are used. Their cross sections can be significantly suppressed [1] by quasifission [2]. This dynamical non-equilibrium process results when the

[1]email: david.hinde@anu.edu.au
[2]Current address: TIFR, Mumbai, India
[3]Current address: National Superconducting Cyclotron Laboratory, Michigan State University, East Lansing, Michigan 48824, USA
[4]Current address: TIFR, Mumbai, India
[5]Current address: Malmö University, Faculty of Technology and Society, 205 06 Malmö, Sweden