

Sub-barrier fusion in superheavy element synthesis

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In reactions successfully used to synthesise superheavy elements, fusion probabilities in sub-barrier reactions show very different characteristics in cold fusion (involving spherical target nuclei close to ^{208}Pb) and hot fusion (involving prolate actinide target nuclei). An empirical approach to interpret experimental fission mass-angle distributions at sub-barrier energies has been developed which can give insights into the competition between fusion and the competing process of quasifission. Extracted probabilities of fast and slow quasifission can in principle be combined to obtain a fusion probability, if it is assumed that distinctive experimental quasifission outcomes are the result of bifurcations of the reaction trajectories over the potential energy surface.