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Entrance Channel in Heavy-ion Reactions for Superheavy Element Production TAKATOSHI ICHIKAWA, AKIRA IWAMOTO, Japan Atomic Energy Research Institute, PETER MÖLLER, ARNOLD J. SIERK, Los Alamos National Laboratory — We discuss both cold fusion reactions of the type that lead to the formation of elements with proton number Z from 107 to 113 and hot fusion, that is reactions with deformed actinide targets [1]. In cold fusion with Pb-like targets we show that for reactions eading to the heavier evaporation residues deformation and shell effects lead to a fusion barrier that is more than 10 MeV lower that what is obtained in a standard spherical macroscopic liquid-drop model. Inside touching we calculate the macroscopic-microscopic potential energies of the composite system in a five-dimensional deformation space consisting of about 4 million nuclear shapes. We find that the composite system exhibits a well-established fusion channel in which the initial composite shape closely matches the shape-polarized shapes just outside touching. In hot-fusion reactions that target is deformed and experimental and theoretical considerations indicate that "equatorial" collision are the most likely to lead to evaporation residue formation. Also in this case we show that shape polarizations lead to a significant decrease of the equatorial fusion barrier. [1] T. Ichikawa, A. Iwamoto, P.Möller, A. J. Sierk, Phys. Rev. C **71**, 044608 (2005).

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