Abstract Submitted
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The amalgamation stage of fusion reactions GENEVIEVE MOUZE, CHRISTIAN YTHIER, University of Nice — There is no need of a repulsive potential in the amalgamation stage for explaining the small fusion cross sections. The repulsive potential proposed by A. Adamian et al.(1) can advantageously be replaced by the affinity of the reaction of re-dissociation of the compound nucleus into its entrance-channel configuration. This reaction, which occurs after the penetration of the Coulomb barrier, is an equilibrium between dual and compact form of the compound nucleus, and the energy Q released in the dissociation is equal to the energy required for amalgamating. The total energy of the confined system being equal to the height B of the Coulomb barrier, the intrinsic excitation energy of the compact nucleus is equal to (B - Q). In the reaction 82Se+ 138Ba (2), the dissociation of 220Th releases 180.524 MeV, and B= 196.08 MeV. With an intrinsic excitation energy of 15.56 MeV, the confined compact 220Th has enough energy for emitting two neutrons (S(2n) = 13.85 MeV). Thus the favored xn channel of fusion reactions can be precisely predicted. This new, mass-data-based model of fusion is completely parameter-free. 1 G.G. Adamian et al., PRC 69 (2004) 044601. 2 K. Satou et al. PRC C 65(2002) 054602.

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