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Formation of a new state of nuclear matter in nuclear fission GENEVIEVE MOUZE, SABET HACHEM, CHRISTIAN YTHIER, Faculté des Sciences, Université de Nice — The mass distributions of asymmetric and symmetric fission of actinide nuclei can be explained. Fissile nuclei are internally clusterized into a ^{208}Pb-like core and a cluster made of its valence nucleons. If the energy released by the dissociation is great enough, the superficial nucleons of the core can be transferred to the cluster in a kind of internal collision, occurring within 1.8 10^{-25}s,as can be demonstrated. This collision creates extreme conditions, and a new nucleon phase replaces the normal proton- and neutron-phases, but conserves their organization law. The transferred nucleons are statistically distributed between the valence shells of an A_H= 126 nucleon core and those of an A_L = 82 nucleon core (or of an A_L = 126 nucleon core in symmetric fission), with a distribution coefficient of 0.206. The closure of the A_L = 126 nucleon shell separates the regions of asymmetric and symmetric fission. The great yield of the symmetric mode results from the appearance of fragment-pair Q_{tot}-values greater than their own Coulomb barrier, i.e. from barrier-free fission.

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