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Polar-side emission of heavy IMFs in ^{197}Au + ^{197}Au collisions at 23A MeV

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In this work we will present some results of our project of studying collisions of very heavy, symmetric systems, which due to the strong Coulomb repulsion cannot fuse at all, and consequently can reveal new interesting and exotic modes of partitioning. Results of analysis of collisions of the ^{197}Au + ^{197}Au system at an energy of 23 A MeV will be presented. The experiment was performed at the INFN Laboratori Nazionali del Sud (LNS) in Catania. For detection and identification of the reaction products the Charged Heavy Ion Mass and Energy Resolving Array (CHIMERA) arranged in 4? geometry was used.

In the presented analysis special attention will be paid to ternary reactions in which in addition to two main fragments, target-like fragment(TLF) and projectile-like fragment(PLF), a third, lighter fragment, usually called an "intermediate-mass fragment" (IMF), is formed. In this work it will be demonstrated that in ^{197}Au + ^{197}Au collisions at 23 A MeV the mass number distribution of IMFs extends up to mass numbers corresponding to partitions into three comparable fragments. It will be also shown that the IMFs are in fact emitted in two different processes. The lightest IMFs of AIMF < 20 show well known features of prompt emission from the interaction zone (neck) during reseparation, while heavier IMFs (of AIMF > 30) definitely originate from sequential (but not equilibrated) decay of the primary, excited projectile-like fragments or target-like fragments. The decaying system evidently keeps memory of the neck configuration and consequently the IMFs are emitted collinearly either from the neck side or from the opposite side along the separation axis (polar-side emission). The new intriguing process of the polar-side emission which dominates for IMFs of AIMF > 50 will be discussed.