



Contribution ID: 215

Type: Poster

Search for High Energy Alpha Particles in the Reactions of 7.5 A MeV ^{197}Au with ^{232}Th

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S. Wuenschel, J.B. Natowitz, K. Hagel, M. Barbui, G. Giuliani, E.J. Kim, N. Blando, H. Zheng, S. Kowalski, K. Schmidt, Z. Majka, Z. Sosin, A. Wieloch.

The search for alternative reaction paths for heavy element production requires a careful experimental investigation of mechanisms other than fusion, e.g., multi-nucleon transfer or very asymmetric fission of even heavier transient systems. Many super heavy elements are expected to decay by alpha particle emission. The heaviest elements are characterized by unusually high alpha particle energies which distinguish them (in general) from the lighter elements. Using ^{197}Au projectiles incident on a ^{232}Th target, we are pursuing survey experiments based upon the implantation of recoiling heavy reaction products in an array of fast plastic scintillators and the detection of alpha particle decays characteristic of these heavy nuclei. The 7.5 MeV/nucleon ^{197}Au beam was pulsed for different time intervals in order to be able to identify species with different half-lives. A large number of interesting high alpha-energy activities were detected both in-beam and out of beam. These data will be discussed, as will extensions of this method.

Primary author: Dr WUENSCHHEL, S. (Cyclotron Institute, Texas A&M University)

Presenter: Dr WUENSCHHEL, S. (Cyclotron Institute, Texas A&M University)

Track Classification: Heavy and Superheavy Elements