HAW09-2009-000626

Abstract for an Invited Paper
for the HAW09 Meeting of
the American Physical Society

Spectroscopy of r-process nuclei using multi-nucleon transfer reaction

Y. HIRAYAMA[1], IPNS, KEK

The β-decay properties of the neutron-rich isotopes with neutron number N = 126, as progenitors on the r-process path forming the third peak (A $\sim$ 195) in the r-abundance element distribution, are supposed to play a critical role for better understanding where the heavy elements such as gold and platinum were made. We will discuss our experimental proposal to study β-decay properties and nuclear structures around N = 126 nuclei. These isotopes could be obtained via the multi-nucleon transfer reactions induced by low-energy intense neutron-rich radioactive ion beams, such as ^{140}Xe and/or ^{144}Xe generated by the facility based on the ISOL and post-acceleration scheme. Since there has not been the facilities in the world yet, as the first step, we are going to produce ^{202}Os (Z = 76, N = 126), which has not been produced in any other facilities, by using the multi-nucleon transfer reactions in ^{136}Xe (stable beam) + ^{198}Pt (target) collision. The Pt target ($\sim$5 μm) is used as the window of the gas catcher for collecting all reaction products by the collision, from which the ^{202}Os will be extracted as singly-charged ions by laser resonance ionization and transferred to a detection chamber after being mass-separated. In this way, both the element (atomic number Z) and mass (A) separations could be possible, allowing study the products of rare reaction channels. The mass separated isotopes are implanted into a tape transport system, which allows us to measure their beta-decays by multi-layered plastic scintillation detectors and germanium detectors of GRETINA.

[1]JPS:39543K