Contribution ID: **151** Type: **Poster**

Study of the neutron-rich region in the vicinity of ^{208}Pb via multinucleon transfer reactions

The production of neutron-rich heavy nuclei in the vicinity of N = 126 shell closure has received a boost of interest recently, since the properties of these nuclei are fundamental for the understanding of the actual path of r-process and synthesis of the heavy elements. The nuclear structure studies in the region close to the double magic ^{208}Pb nucleus, where benchmark cases are expected, may significantly improve our understanding of the effective interaction. Therefore, it is of great importance to overcome the difficulties in production of those neutron-rich heavy nuclei and in their direct identification with present techniques. A promising mechanism for their production is the use of the multinucleon transfer (MNT) reactions. This mechanism was extensively used for the nuclear structure and dynamics studies, mostly for the neutron-rich nuclei [1,2] in vicinity of the light partner.

A recent development of neutron-rich heavy-ion beams paved a way to populate the neutron-rich region around the heavy partner by the use of the MNT [3,4]. We performed a first measurement of the transfer reactions in the ^{94}Rb+^{208}Pb system at energy close to the Coulomb barrier at HIE-ISOLDE. The high-resolution MINIBALL spectrometer, coupled to a position sensitive silicon detector, provided the selection of the transfer channels via the associated γ rays. The yields in the neutron transfer channels will be presented and compared with the reaction models. The preliminary results demonstrate that the dominant transfer flux is towards the neutron-rich Pb isotopes, showing that the MNT with the use of the neutron-rich beams is a suitable reaction mechanism to populate moderately neutron rich heavy nuclei.

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Session Classification: POSTER SESSION