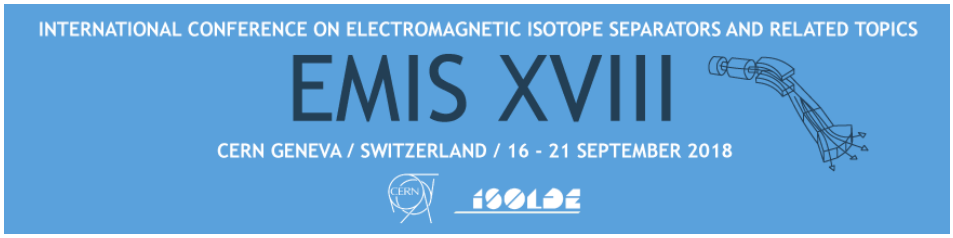

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Low energy nuclear structure spectrometer specific to multinucleon transfer reactions at HIAF

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The study of the nuclear structure and exotic decay property of neutron-rich isotopes is nowadays an important subject in nuclear physics research. To date, by using nuclear fusion-evaporation reaction, projectile fragmentation, proton (neutron)-induced fission, and spontaneous fission, we can only produce neutron-rich isotopes with a small charge number Z. For significantly more neutron-rich isotopes with higher Z>70, there is no appropriate method to production except multinucleon transfer reaction, which is believed to be the most possible way to produce those neutron-rich isotopes.

At the ongoing large-scale scientific project HIAF (High Intensity heavy-ion Accelerator Facility), a low energy nuclear structure spectrometer specific to the multinucleon transfer reactions is being designed and constructed. In this spectrometer, the research will be concentrated on synthesis and the identification of new neutron-rich nuclides, and on the study of their nuclear structure and decay properties. Unlike the fusion evaporation and projectile fragmentation products which are emitted near 0° in the forward direction in a laboratory frame, the outgoing angles of the products from multinucleon transfer reactions cover a wide range of 25° - 80°, thus it is very difficult to collect and separate the products of interest.

In the conference, the motivation, conceptual design and working principle of this spectrometer will be introduced. Computer simulation results and mechanical considerations will also be presented.

Primary authors: Prof. HUANG, Wenxue (Institute of Modern Physics, Chinese Academy of Sciences); Dr TIAN, Yulin (Institute of Modern Physics, Chinese Academy of Sciences); Dr WANG, Yongsheng (Institute of Modern Physics, Chinese Academy of Sciences); Mrs WANG, Junying (Institute of Modern Physics, Chinese Academy of Sciences)

Co-authors: Prof. GAN, Zaiguo (Institute of Modern Physics, Chinese Academy of Sciences); Prof. LIU, Zhong (Institute of Modern Physics, Chinese Academy of Sciences); Prof. LIU, Minliang (Institute of Modern Physics, Chinese Academy of Sciences); Prof. YANG, Jie (Institute of Modern Physics, Chinese Academy of Sciences); Prof. MA, Xinwen (Institute of Modern Physics, Chinese Academy of Sciences); Prof. ZHOU, Xiaohong (Institute of Modern Physics, Chinese Academy of Sciences)

Presenter: Prof. HUANG, Wenxue (Institute of Modern Physics, Chinese Academy of Sciences)

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