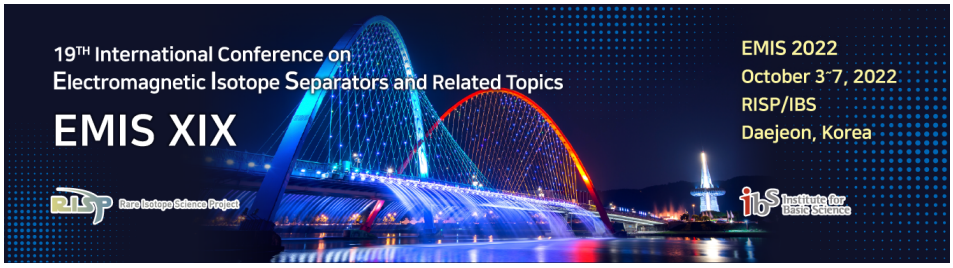

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Development of neutron detection systems at the NDPS of RAON

Thursday, 6 October 2022 11:50 (20 minutes)

Nuclear Data Production System (NDPS) at RAON has been built to produce nuclear data mainly generated by the reactions induced by neutrons of tens of MeV. For the neutron Time-Of-Flight (TOF) measurement, neutron monitoring detectors based on a gas-filled Parallel Plate Avalanche Counter (PPAC) and a MICRO-MEsh-GASeous (MICROMEGAS) detector have been developed by the Rare Isotope Science Project (RISP) and Sungkyunkwan University (SKKU). These detectors have a neutron converter with a thin ^{232}Th layer, which produces fission products due to fast neutrons. The PPAC achieved a 1 ns FWHM time resolution in a test with a ^{241}Am α source and also showed good performance when tested with fast neutrons generated by a 45 MeV proton beam through the ^{9}Be(p, n)^{9}B reaction. Additionally, EJ-301 liquid scintillation detectors will be used for the measurement of neutron flux with pulse shape discrimination capability. Slow charge signals as well as fast timing signals from the detectors will be processed for particle identification by a data acquisition(DAQ) system, located at a separate control room through 30 m long cables. Development of the detection system and the test results will be reported with on-site assembly status.

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