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Experiments for nuclear data using RCS at J-PARC and HiRadMat at CERN/J-PARC RCS と CERN HiRadMat を用いた核データのための実験

Since the experimental nuclear data is scarce in the kinetic energy region around GeV, which is crucial for high-power proton accelerators, such as Accelerator Driven System (ADS), 3-GeV synchrotron called RCS (Rapid Cycling Synchrotron) and beam transport facility 3NBT, conveying the beam from 3-GeV synchrotron to Material Life Science Experimental facility (MLF), play important roles in obtaining nuclear data. J-PARC is an incredibly attractive facility for studying nuclear data for ADS because J-PARC can only provide the users with the proton beam in the GeV region in Japan. RCS and 3NBT can easily vary the extracted beam's kinetic energy, and many experimental data were obtained.

From the early stage of J-PARC, the experiment was conducted to obtain the cross section of nuclide production with a projectile of protons. To validate the calculation model of spallation neutron spectrum produced at the most backward angle, which is essential to evaluate the shielding for ADS due to the duct streaming for the proton beam transport, the spectrum of the neutron from mercy target placed at MLF was observed using a small scintillator. Experiments for the displacement cross section were conducted to validate the material damage model. This talk will present the future experiment plan by using 440 GeV protons at HiRadMat CERN to obtain the displacement cross section for extremely high-energy regions.

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