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Design Study of an Axial Injection System for MC50 Cyclotron at KIRAMS

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A multi-purpose cyclotron, MC50 has been operated to provide multi-ions of proton, deuteron and alpha at Korea Institute of Radiological and Medical Sciences (KIRAMS). Neutron is also produced through the (p,n) nuclear process with a Be target. However, a wide spectrum of current of ions is requested by beam users for carrying their various application fields. Therefore a simulation study is requested on the design of an axial injection system for high current proton and alpha beam extraction for radio-isotope productions and scientific researches. The purpose of this study is seeking a relatively simple method for the MC50 having higher alpha beam capability and also improving proton and deuteron beams currently used. We are considering two possibilities to improve the internal ion source and to install a new external axial injection system. The external injection system will be consisted of an Einzel lens, a steering magnet, a buncher, and a glazer lens placed in front of an inflector, which is located at the center of the main magnet.

Keywords: MC50 Cyclotron, external ion source, axial injection system