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A 70-MEV PROTON CYCLOTRON SYSTEM OF IBS FOR MULTIDISCIPLINARY UTILIZATION

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A 70 MeV H⁻ cyclotron system was commissioned in the Institute for Basic Science (IBS) using 40 - 70 MeV beams, and isotope separator on-line (ISOL) system is recently tested at a beam current of 1 μ A. The beam commissioning was carried out primarily in the aspects of forming specified beam shapes at the entrance of ISOL target in cave A and testing a high-power beam of 50 kW at 70 MeV for six hours in cave B. A temporary beam line was installed in cave A to measure beam profiles formed by a 60-Hz wobbling magnet at the target location. A beam position monitor built in-house was used to measure beam off-center and currents. In addition, beam emittance was measured by variation of quadrupole strengths and using a beam profile monitor, which was compared to emittance used for beam transport calculation. All beam tests for site acceptance were completed by the end of 2022. Now we plan to install a neutron production target in cave B after a minor modification on the beam line. Also, medical isotope production is envisioned utilizing a spare vault, but first we need to install a new beam line extended from 2nd extraction port of the cyclotron, which will allow simultaneous extraction of two beams for instance for ISOL operation and isotope production. In the spare vault two isotope production targets can be accommodated to produce such as ⁶⁸Ge and ⁶⁷Cu.

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