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Commissioning of the 72 MeV Transfer Line for the Buncher Based Beam Injection into the Ringcyclotron

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In the last year, the extraction of a 2.4 mA proton beam became a well established operation mode of the 590 MeV Ringcyclotron. The enhancement of the beam power up to 1.42 MW at a relative loss level of 10-4 has evolved from modifications applied to the PSI high power proton facility, reported earlier. However, the layout of the 3rd harmonic cavity has reached its operation limits. To advance the extracted beam intensity towards 3 mA, a 500 MHz rebuncher has been installed in the 72 MeV transfer line between Injector 2 and the Ringcyclotron. To meet the needs of this buncher based injection, several investigations were performed. In particular a demanding control of the dispersion along the 72 MeV transfer line has been worked out, a more flexible algorithm to change the number of revolutions in the Ringcyclotron has been established, and an improvement of the matching has been found. Moreover, a precise modelling of the space charge effects in the injection region of the Ringcyclotron has been recognized as mandatory, since these have to be compensated by the installed flattop system.

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talk

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