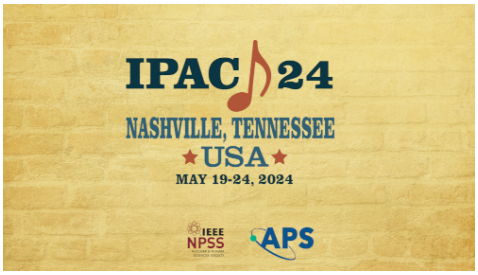

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Investigation for the applicability of a Hall probe measurement in B-field control for synchrotron duty cycle optimization

Thursday, 23 May 2024 16:00 (2 hours)

MedAustron is a state-of-the-art synchrotron-based accelerator complex that provides irradiation with proton and carbon ion beams. The implemented DCCT feedback based control of the current provides good results for magnets of the accelerator in terms of precision and accuracy. However, since the B-Field of the main ring dipoles is not directly controlled, parasitic, time consuming effects cannot be compensated. Hence, the implementation of a B-Field control system offers a major improvement opportunity for the operation. This contribution presents the measurement chain of the proposed solution which is centered around a Hall probe located in the so-called B-train magnet. This approach requires an assessment of the applicability of local Hall probe measurements for this purpose, including the development of a model for relating the respective local measurement to the integral field. Ultimately, the Hall probe has shown characteristics of high accuracy and a measurement uncertainty that is below the overall field error target of 2 units. The model was tested under laboratory conditions and an accurate estimation of the integral field has been observed in the scope of simulations.

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