

GFA & SwissFEL Accelerator Seminar

Charting a course for high power FFAG Proton drivers

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Cyclotrons are an incredible type of accelerator, for decades they have provided hadron beams of high intensity and high average beam power for a wide range of applications. In the future, even higher beam powers will be required as we move into the realm of 10 MW-class machines and uncover the potential for new applications such as Accelerator Driven Systems. Retaining cyclotron-like properties such as a fixed magnetic field, but incorporating focusing principles more familiar to the synchrotron community, the Fixed Field Alternating Gradient accelerator can be viewed as a kind of ‘strong focusing’ cyclotron. Could the FFAG be a promising candidate for next-generation high power proton drivers? In this seminar, I will outline the principles of FFAG accelerators, overview recent advances in lattice design of non-scaling FFAGs and issues such as isochronicity and chromatic correction. I will then discuss the experimental and simulation campaigns - of the international FFAG collaboration, with the 150 MeV proton FFAG at Kyoto University Research Reactor Institute. I will focus my discussion of simulation on recent updates to the OPAL framework, an international code development project led by the AMAS group at PSI, now applied to FFAGs. Finally, I will present my perspective on what needs to be achieved to bring this innovative type of accelerator into the high power regime, and how the cyclotron community can (and should) get involved.



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