Contribution ID: **499** Contribution code: **WEPM116** Type: **Poster Presentation**

Application of fast algorithms to calculate dynamic and momentum aperture to the design of ALBA II

Wednesday 4 June 2025 16:00 (2 hours)

In synchrotron light sources, the non-linear magnetic fields and Touschek scattering limit the stability of electron motion, determining the dynamic aperture (DA) and the momentum acceptance (MA). Optimizing both the DA and the MA is crucial to maximize injection efficiency and the beam's lifetime, but it is numerically expensive. We implement recently developed algorithms that speed-up their calculation in CPUs: Flood Fill and Fast Touschek Tracking (FTT). Applying these to the analysis of the ALBA II lattice and comparing them to the existing methods, we obtain rigorous and faster results using Flood Fill, and ones with a slight loss of accuracy for FTT.

Footnotes

Paper preparation format

LaTeX

Region represented

Europe

Funding Agency

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Session Classification: Wednesday Poster Session

Track Classification: MC5: Beam Dynamics and EM Fields: MC5.D02 Nonlinear Single Particle Dynamics Resonances, Tracking, Higher Order, Dynamic Aperture, Code Developments