Summary on Session 2 (Monday afternoon)

There were 7 talks: 1 review and 6 contributions

Out of 6 contributions, there were

- 2 talks on instability estimates for new (upgraded) rings
- 1 talk on measurement of instabilities and comparison with expectations + new numerical & theoretical instability evaluations
- 3 talks on code development (2 on instability simulations + 1 EM field solver)

Review talk

Karl F. Bane (SLAC) addressed in a comprehensive manner collective effects that are expected to be especially issues in the future ultra low emittance rings (by taking PEP-X as an example in many cases): IBS, Touschek, Microwave due to CSR and machine impedance, transverse instabilities, as well as beam instability simulation methods (tracking, VFP, ..)

Two talks on upgraded DLSRs

Simon White (ESRF): Comparison between the current machine and future machine in terms of Lattice, vacuum chambers systems, instabilities measured vs preliminary estimates for future machine In particular, new vacuum chamber geometry (very small apertures required), novel designs of flanges, RF fingers, BPMs, …

Ryan Lindberg (APS): Good experience obtained from the current machine in modelling and reproducing the instabilities. New vacuum component designs for APS-U (e.g. asymmetric absorber), improved simulation methods necessary for DLSRs (inclusion of higher-order nonlinear terms, element-by-element transformations, …), simulation of on-axis injection with TFB and difficulty found in not losing the electrons, need of new simulation tools, …

Comparison measurement vs analysis

Gabriele Bassi (NSLS-II): Elaborated treatment of BbB data and display. Comparison with BBR model predictions of; bunch lengthening, energy spread widening, head-tail mode spectra and TMCI. Analysis of damping signals with higher-order effects (such as ADTS). PETRA-III cavity HOM analysis & impact on the beam. Novel frequency domain eigenvalue approach to arbitrary multibunch filling and comparisons to analytical and tracking methods.

Three talks on code development

Lotta Mether (CERN): Development of a Fast Beam-Ion Instability (FBII) simulation code embedded in PyHEADTAIL. Strong-strong model. Great advantages thanks to links to existing modules in PyHEADTAIL and PyECLOUD. Improvement in cpu-time, gridding, parallelisation, …

Igor Zagorodnov (DESY): Review history of ECHO develipment. Major efforts made on; - Low dispersive schemes, - indirect algorithm, modelling of conducting walls, … Different versions: Geometries of revolution (ECHOz1, ECHOz2), - Rectangular structures (ECHO2D), - Fully 3D geometries (ECHO3D), - Particle-In-Cell code

Patrik Schoenfeld (KIT) on a Parallelized Vlasov-Fokker-Planck Solver for Desktop PCs. A great reduction (a factor of 150!) in the CPU achieved thanks to parallelisation.