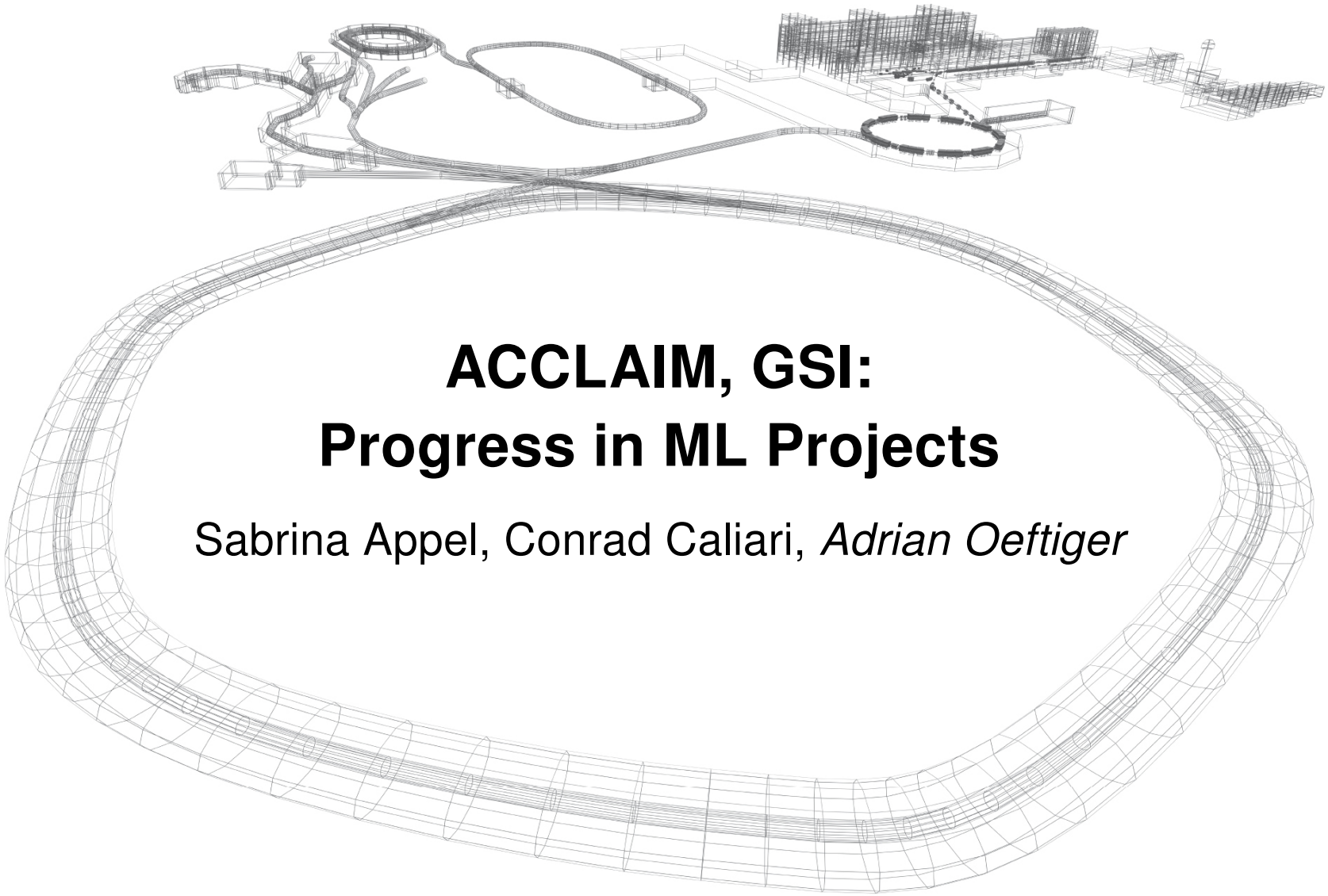
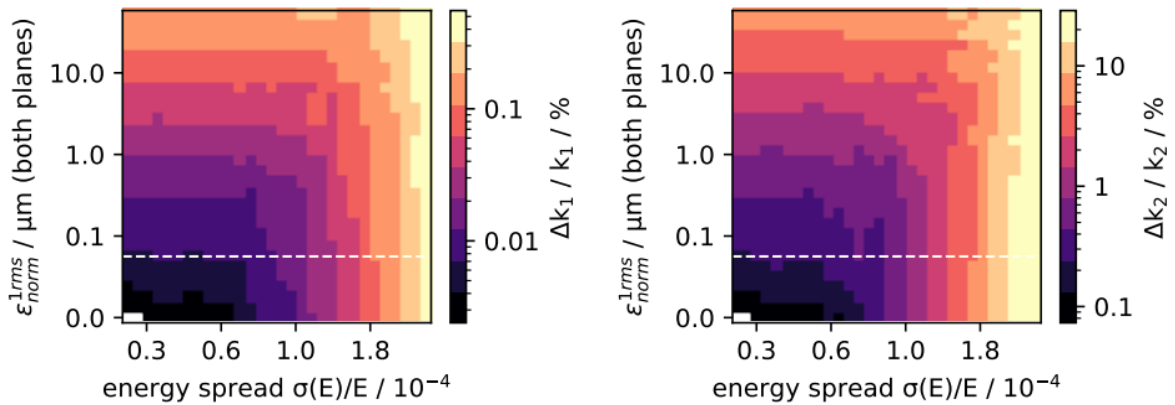


ACCLAIM, GSI: Progress in ML Projects

Sabrina Appel, Conrad Caliari, *Adrian Oeftiger*

Status GSI

- Conrad Caliari: “Identification of Magnetic Field Errors in Synchrotrons based on Deep Lie Map Networks”
  - → preprint on arxiv ↗, based on thin-lens machine model
  - → model learns quadr. + sextup. errors from centroid motion (BPM data)
  - → data set for SIS18 (217m, 12 BPMs): few 10 shots with ≈ 3 turns



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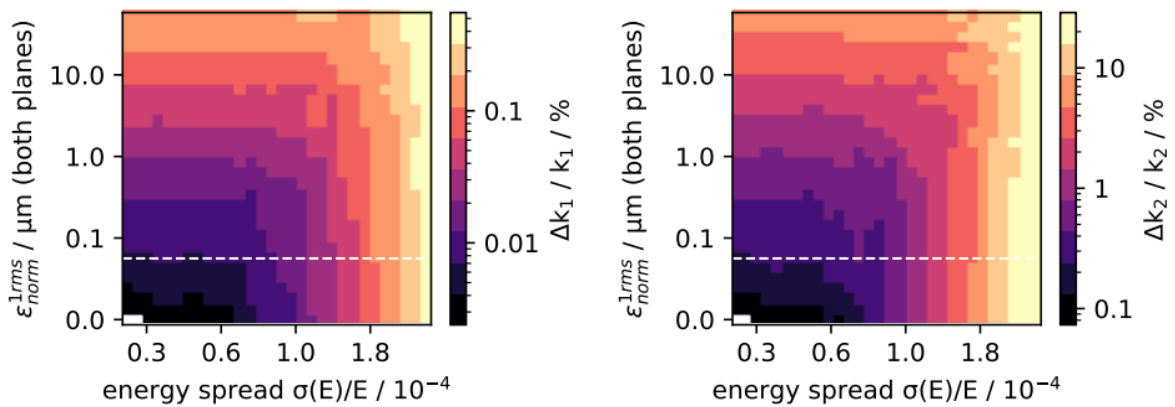

- established a first python interface to machine control via LSA using adapted CERN package `pjlsa`, working on `pyjapc` to subscribe to published instrumentation / diagnostics data
- new EU-funded postdoc position with Sabrina Appel to start from 01.03. on machine learning algorithms for beam control

DLMN Concept

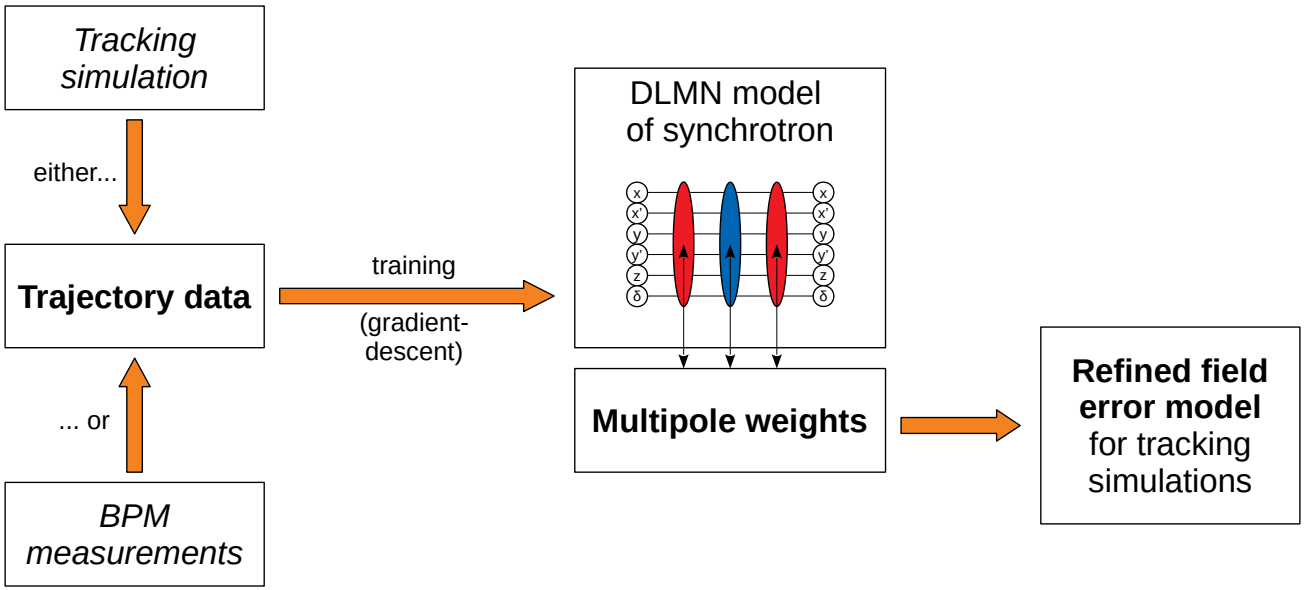

Figure: sketched work flow of training process with Deep Lie Map Network (DLMN)

Training Results

All magnets have random quadrupole and sextupole errors:

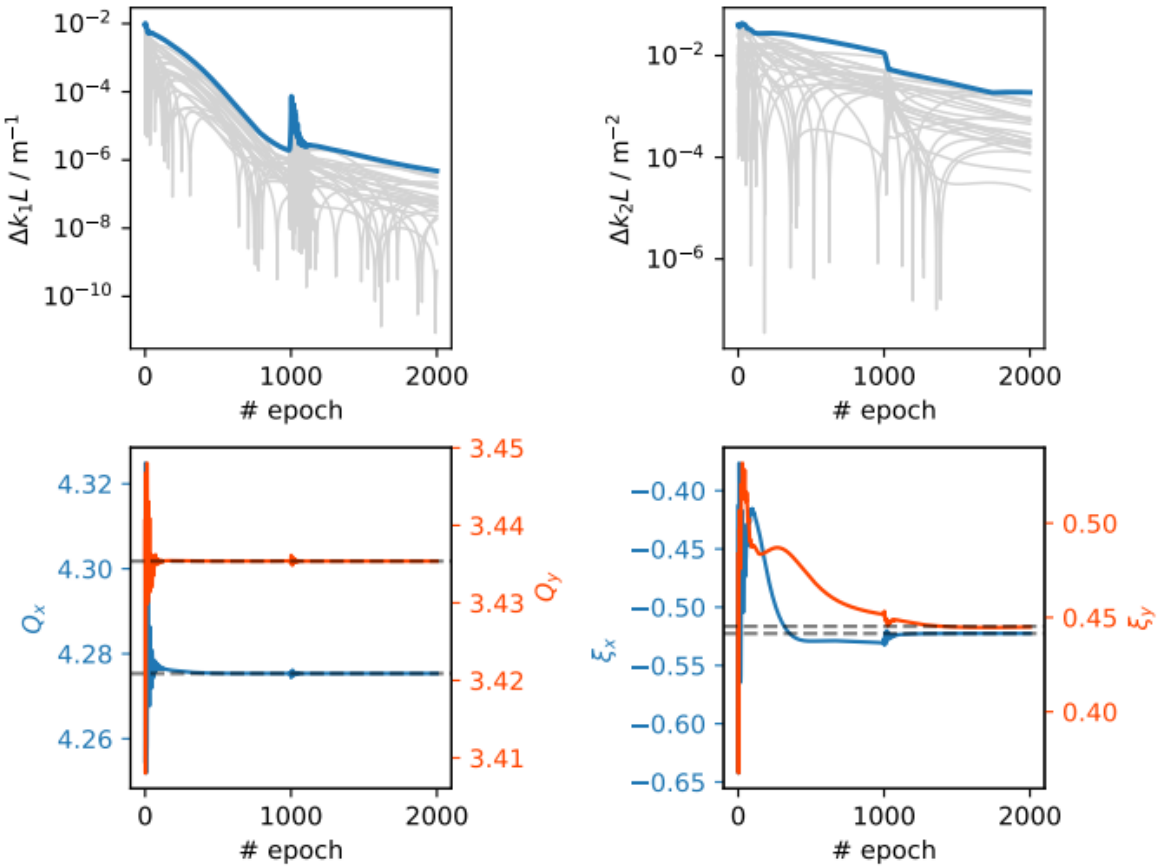

Figure: top: difference between learned and “real” quadrupole and sextupole components during training; bottom: convergence of tune and chromaticity