RL4AA'23: meet & greet session

Dr. Sabrina Appel

2008 starting working with accelerators, PhD 2011

Since 2014: Automated optimization with numerical + nature optimizer

s.appel@gsi.de, http://web-docs.gsi.de/~sappel/index.html

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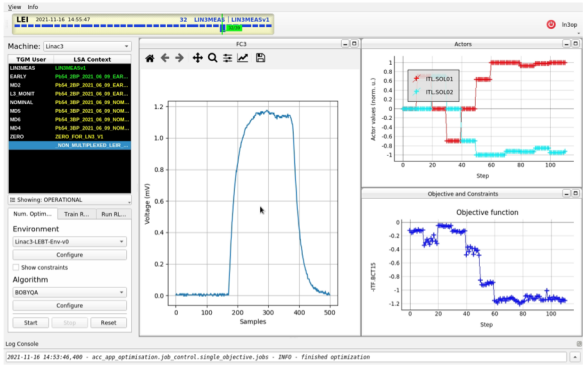
- EUROLABS WP5 Task 3:
- scientific staff member for 3 years at GSI

➢ The aim is to find the optimum framework for usable ML algorithms for accelerator problems.

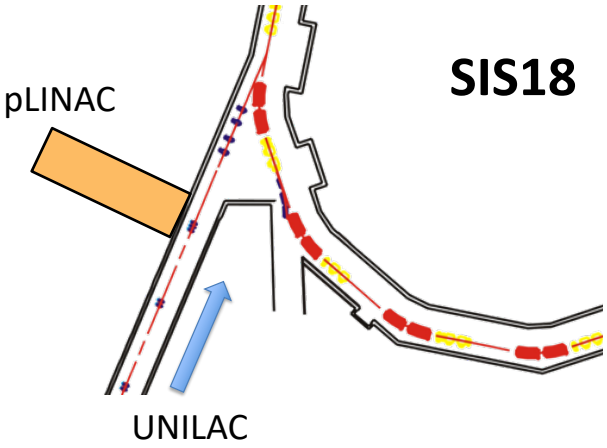
➢ **Open Data**: Share algorithms and application across facilities + Beam optimization algorithms and ML library

➢ Based on GEOFF (CERN gitlab)



GSI topics

Injection optimization

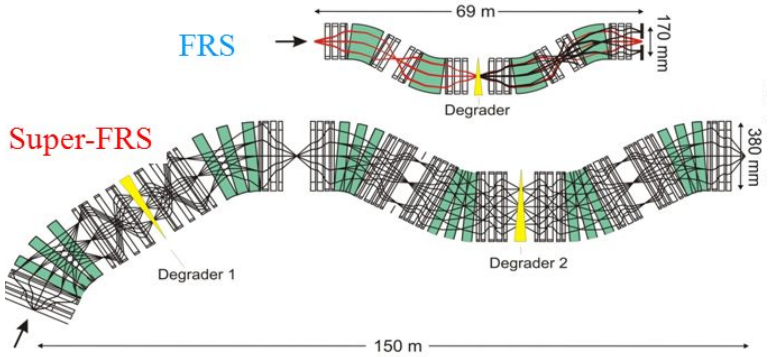


MTI optimization with Bayesian and maybe with RL

Space charge + loss-induced vacuum degradation
Septum protection: Uranium ions can destroy wires

S. Appel et al: International Journal of Modern Physics A Vol. 34, 1942019, (2019),
S. Appel et al: Nucl. Instrum. Methods A 852 (2017), pp. 73-79,
S. Appel et al., J. Phys. Conf. Ser 1350 (2019) 012104

Optimize transport of fragmentation beams



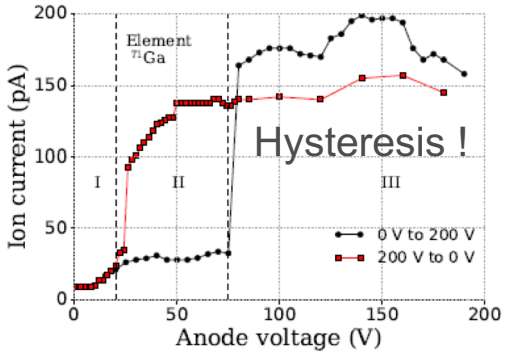
FRS/Super-FRS (GSI/FAIR)

- Optical coefficient tuning
- Detector/degrader calibration
- Optimization of spectrometer parameters

CERN topics

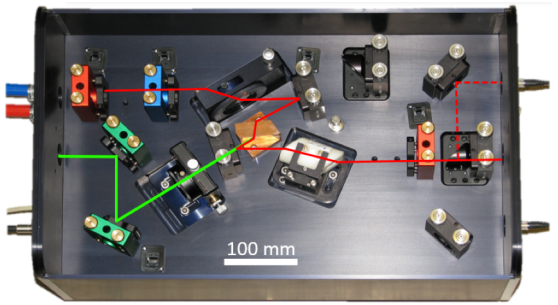
Ion Sources optimization:

FEBIAD



Y. Martinez Palenzuela, Thesis (https://lirias.kuleuven.be/handle/123456789/636675)

and RILIS

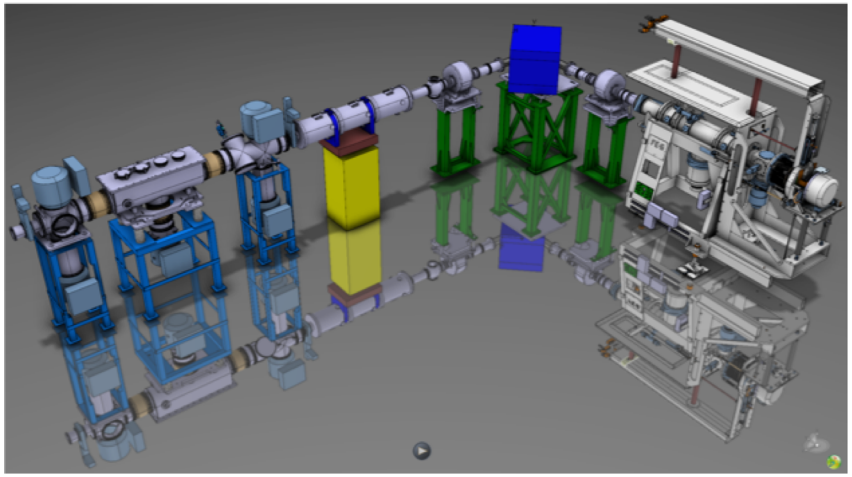


Valentin Fedosseev et al 2017 J. Phys. G: Nucl. Part. Phys. 44 084006, Doi: 10.1088/1361-6471/aa78e0

- Laser cavity has >5 parmeters
- Optomechanics has hysteresis !

ISODLE beam line

ISOLDE offline 2:
Testing optimizer and RL algorithms
+ and AWAKE beam line



and more …