Accelerator Reliability Workshop 2019(2019 加速器可靠性国际研讨会)

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## Status of Application of Machine Learning Techniques at CRYRING ESR

Friday, 15 November 2019 09:00 (30 minutes)

The ion storage ring is a FAIR phase 0 machine and used as test bed for FAIR concepts and prototypes in addition to being a facility for physics experiments. CRYRING ESR is equipped with an offline ion source and linear accelerator providing ion beams with energies up to 300 keV per u. This so called injector can be operated independently of FAIR or GSI and is used for machine testing and local physics experiments. In this setting, we are investigating in how far machine learning can be employed for the supervision and the operation of the local plasma ion source and the injector or linear accelerator section. One goal of the project was to implement automated machine optimization in the framework of the FAIR control system. In a more recent project we investigate if the analysis of detector raw data provides signals making it possible to predict if the ion source will run within or without of the desired operation regime. A machine learning algorithm shall generate signals allowing preventive human action on the ion source if required. We will report on the status of the project of making machine learning techniques available for CRYRING ESR.

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