

Rapport final

Titre	Data mining on the Arronax accelerator for irradiation optimisation
Etudiant (Prénom, Nom)	Otis Cooper
Mots clefs (5 environ)	machine learning, particle accelerator, anomaly detection, time series, clustering

LABORATOIRE IMPLIQUES

Participant	Nom Prénom	Laboratoire
1 (coord.)	Poirier Freddy	Arronax
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RESUME "GRAND PUBLIC"

20 lignes maximum

Providing precise irradiation for radioisotopes production relies heavily and in part on the knowledge of the impact of the most effective settings of the accelerator that is being used. This is essential to secure irradiation within some time and specifications. The present project aims to focus on the accelerator data when the irradiation is performed, specifically to put the ground knowledge and potential scenarios of operation that lead to the study of optimization and failures of irradiations.

In order to explore the capacities of various models to detect anomalies on a single data, here the average number of particles hitting a target over time, it has been devised an exploratory map of methods to unravel anomalies. For this, several methods, from machine learning, have been studied. A selected methods (CBLOF) has then be applied to cluster various anomalies occurring during runs over several years and a first analysis of the outcome has helped to point to the accelerator sub-system failures, potentially opening, on a bigger scale, the road on the understanding of the operation of the accelerator.