



Dipartimento di Fisica  
Università di Cagliari  
INFN, Sezione di Cagliari



# HIGH ENERGY PHYSICS COLLOQUIA

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## MACHINE LEARNING FOR DARK MATTER SEARCH EXPERIMENTS

### Abstract

Machine learning (ML) has been widely applied in high energy physics to help the physician community in particle identification and data analysis in general. This talk addresses two examples of ML approaches in DEAP-3600 and DarkSide experiments for dark matter direct detection in liquid argon.

One application is related to the problem of mitigating background events in the DEAP-3600 experiment (SNOLAB, Canada) using different estimators (Boosted Decision Trees -BDT-, Neural Networks); a second application with Convolutional Neural Networks for position reconstruction in DarkSide experiments will then be discussed.

In both cases, the focus will be on the ML techniques for the data analysis, the training routine, the validation protocol, the integration of ML models into the analysis.

### External Link:

Presentation room [here](#).

Slides can be found on the INFN HEPC [website](#)  
or at the indico event [link](#) after the seminar.

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