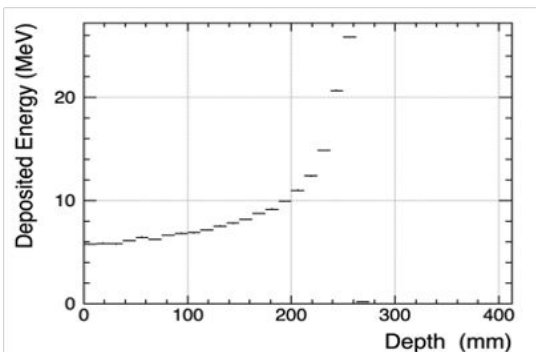


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Highlights - simulation

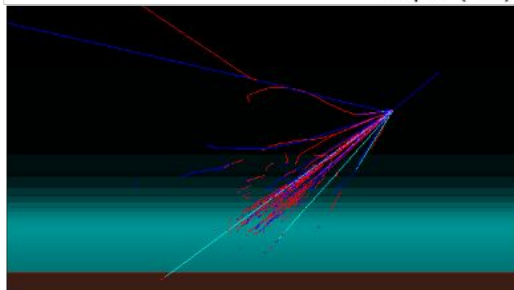
Charged particle therapy simple set up

- Water, muscle, skin, ...
- Proton, Carbon, gamma, electron;



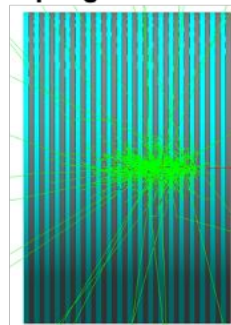
PlanetRAD

- Earth, Mars, Moon, Interplanetary;
- Cosmic ray flux (solar min/max), SEP spectra, fixed energy;

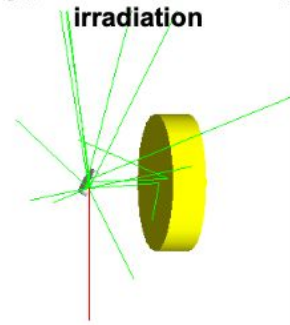


Recent developments

Sampling calorimeter



X-ray production and sample irradiation

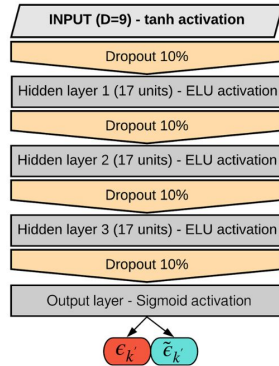
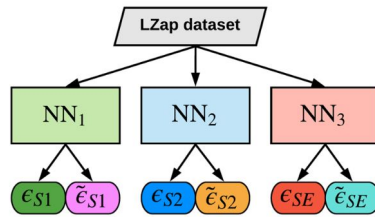


+ other applications, including β spectroscopy using magnetic field, gamma spectroscopy in plastic and crystal scintillators, ...

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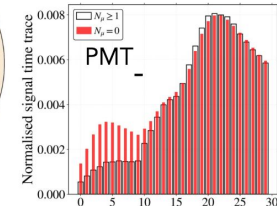
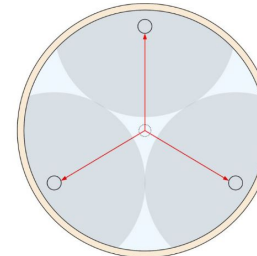
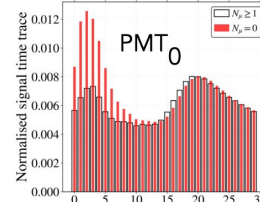
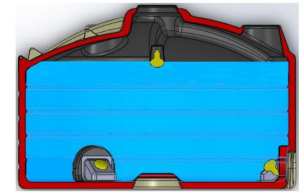
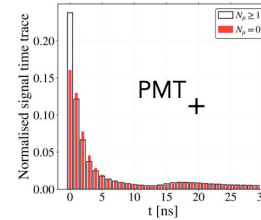
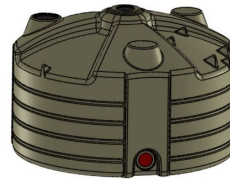
Highlights - machine learning

arXiv:2201.05659



arXiv:2203.08782

CNN to get the probability that a muon has passed through the WCD

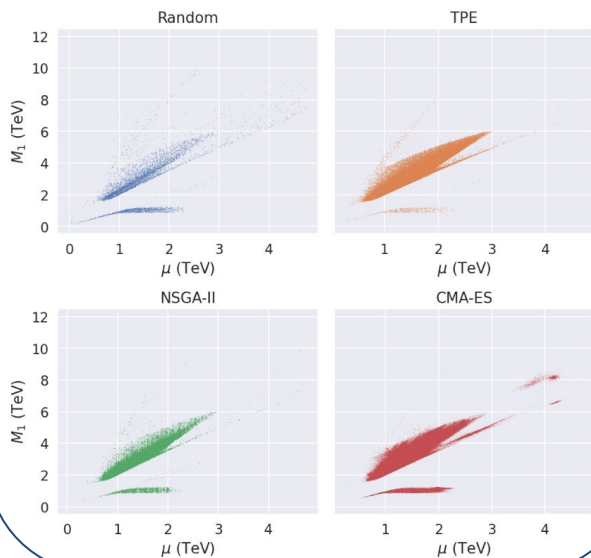


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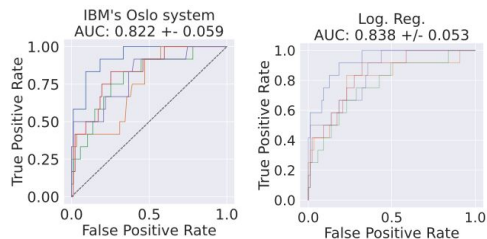
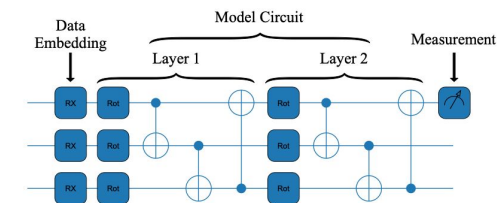
Highlights - machine learning

arXiv:2206.09223

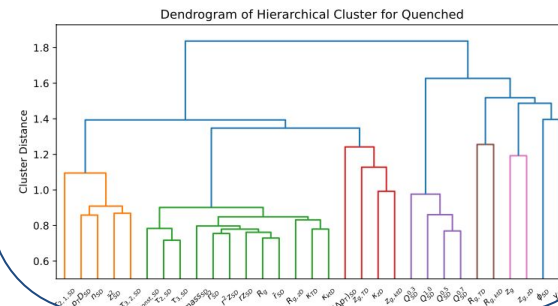
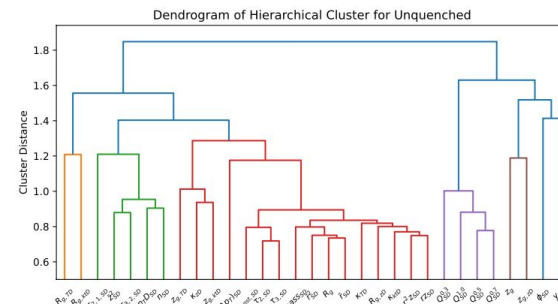
cMSSM, $C(m_h^0, n_{\Omega_{DM}h^2})$



arXiv:2211.03233



arXiv:2304.07196



Competence Centre on Simulation and Big Data

SWOT

Strengths

- Integration in international collaborations (HEP experiments, Geant4 collaboration)
- Diverse team, consolidated by competitive fundings (some secured by the Competence Center)
- Good synergies with the computing team and INCD

Weaknesses

- We are still below the critical mass in some areas
- We continue to improve the communication between groups, but there is still work to be done

Opportunities

- The Horizon Europe programme has a strong focus on Digital Transformation

Threats

- Extremely competitive areas, involving a community much larger than the HEP