



Contribution ID: 6

Type: **Lecture**

Differentiable programming for Experimental Design

Wednesday 7 September 2022 11:00 (25 minutes)

The full optimization of the design and operation of instruments whose functioning relies on the interaction of radiation with matter is a super-human task, given the large dimensionality of the space of possible choices for geometry, detection technology, materials, data-acquisition, and information-extraction techniques, and the interdependence of the related parameters.

On the other hand, the construction of a fully differentiable pipeline and the use of deep learning techniques may allow the simultaneous optimization of all design parameters, overcoming issues coming from the underlying stochasticity of the involved processes. Such optimizations involve finding the minimum of a function describing a complex, multidimensional landscape.

In this talk I will describe gradient-descent-based optimization (powered by automatic differentiation tools) of a multidimensional phase space, and the issues that can be encountered in optimizing these complex landscapes, offering some possible solutions.

Is this abstract from experiment?

No

Name of experiment and experimental site

N/A

Is the speaker for that presentation defined?

Yes

Details

Dr. Pietro Vischia, Institut de Recherche en Mathématique et Physique, Université catholique de Louvain, <https://cp3.irmp.ucl.ac.be/Members/pvischia>

Internet talk

No

Author: Dr VISCHIA, Pietro (Universite Catholique de Louvain (UCL) (BE))

Presenter: Dr VISCHIA, Pietro (Universite Catholique de Louvain (UCL) (BE))

Session Classification: High Energy Particle Physics