Proposition de stage – Année 2019-2020

Niveau du stage : M2

Durée du stage : 4 mois

Ouverture éventuelle vers un sujet de thèse : Oui/Non

Type de financement envisagé : Ecole Doctorale

Responsable du stage : Ece ASILAR, Maxime Gouzevitch

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Domaine Scientifique de la Doua – Bât. Paul Dirac
4 rue Enrico Fermi – 69622 Villeurbanne Cedex - France

Equipe d'encadrement : CMS

Thématique : Experimental high energy particle physics – CMS experiment

Intitulé du stage : Building and evaluating of deep learning models to reconstruct Higgs boson mass

Description du travail demandé :

As the IP2I team, we are proposing a project which combines two exciting developments of recent years. The aim of our project is to use the latest artificial intelligence methods, i.e. the deep neural networks, to reconstruct the Higgs boson mass in a fast and robust way.

After the Nobel prized discovery of Higgs boson in 2012, physicist have continued investigating the properties of this new particle. To identify this boson as a SM Higgs boson, it is crucial to understand its couplings to fermions. The observation of the decay of Higgs boson to a pair of tau leptons was the first indication of a fermion coupling. This decay mode is now the most favourable channel as it has the highest event rate among the other leptons.

Our team (2 permanent researchers, 1 post-doc and 1 PhD student) has developed a well-recognised expertise in H→ττ analysis in CMS experiment.

The successful student will contribute significantly to the Higgs boson mass reconstruction using deep learning as a part of the IP2I team. The task of the student will be to train and evaluate deep learning models using four momentum of the Higgs boson decay components as an input. Besides being very enthusiastic about Higgs physics and AI, having basic python programming skills will be favourable. Knowledge on Keras and Tensorflow is a bonus.

Internship offer – Year 2019-2020

Internship level: M2

Duration: 4 months

Possible PhD follow up: Yes/No

Proposed PhD funding type: Ecole Doctorale

Supervisor: Ece ASILAR, Maxime Gouzevitch

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Mentoring team: CMS

Research field: Experimental high energy particle physics – CMS experiment

Internship title: Building and evaluating of deep learning models to reconstruct Higgs boson mass

Work description:

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