

IFJ PAN Particle Physics Summer Student Programme 2022

Seminars

1 Monday, July 18th, 9:00 – 9:45, main lecture hall (aula)

Experimental efforts in understanding color confinement – subjective overview from NA61/SHINE

dr Maciej Lewicki

In my talk I will briefly introduce the phenomenon of color confinement, with a special focus on the experimental aspects of phase transition between hadronic matter and the quark-gluon plasma. I will also review the efforts of NA49 and NA61/SHINE Collaborations at CERN directed towards discovery and understanding of the onset of deconfinement.

2 Tuesday, July 19th, 9:00 – 10:45, main lecture hall (aula)

Deep Neural Networks

dr hab. Marcin Wolter

One of the most effective tools used in Machine Learning are Deep Neural Networks, which started the revolution in artificial intelligence. Now they are commonly used in various classification tasks, but also in other application like image or text generation. The “hands on” tutorial gives basic introduction to deep neural networks and shows, how to run simple code using Google Colab as a platform and keras package implementing Deep Neural Networks.

3 Wednesday, July 20th, 9:00 – 9:45, MSD lecture hall

Feynman graphs, where do they come from?

dr hab. Andreas van Hameren

Feynman graphs are essential in elementary particle physics. I will give an explanation how they appear when you engage in calculations related to observables in collider experiments.

4 Thursday, July 21th, 9:00 – 9:45, MSD lecture hall

How you can have your cake and eat it? Detection of diffractive events

dr Maciej Trzebiński

I will discuss how one can learn about a peculiar event production – so-called diffractive physics. In such events particles (like a Higgs boson) can be produced, but the interacting protons remain intact. It is like eating the cake and still having it! Such protons are produced when a colourless object – photon (electromagnetic) or Pomeron (strong interaction) – is exchanged. Thus, they may be a signature of so-called diffractive and “Beyond Standard Model” physics. I will discuss detection and reconstruction techniques used at the LHC to measure such events.

5 Friday, July 22nd, 10:00 – 10:45, main lecture hall (aula)

g-2: anomalous magnetic moments of leptons

prof. dr hab. Andrzej Czarnecki

The Fermilab result on the muon g-2 is put in perspective, including the history of g-2 measurements and theoretical evaluations. The behaviour of a relativistic muon in a magnetic field will be described in an accessible manner. A variety of Standard Model contributions and some possible New Physics effects will be discussed. g-2 experiments with free and bound electrons will be mentioned as well.