KSETA Topical Courses, April 1 – 16, + June 3, 2019

Courses without information in red will take place at Campus South in building 30.23, room 3/1.

Introduction to Regge theory and Gribovs Reggeon calculus (deeper) theoreticians Non-pertubative QCD	**Klaus Werner** **(Univ. Nantes)**	01.04.2019 02.04.2019	**13:30 - 16:45 h** **09:00 - 12:15 h**

Machine learning, deep learning, (broader) Theoreticians, exp., engineers	**Gregor Kasiezka (DESY)**	**04.04.2019** (kl. Hörsaal B)	**09:00 - 12:15 h** **13:30 - 16:45 h**

Machine Learning has become a very relevant area of the scientific analysis, teaching a computer to understand the concepts based on a given data. The course will be focused on convolutional/recurrent neural networks and supervised/unsupervised learning. The main concepts and advantages/disadvantages of these methods will be introduced and followed hands-on training with a particular application in particle/astroparticle physics. The basic knowledge about machine learning would be advisable.

Applying Python in Scientific Computing (broader) Theoreticians, exp., engineers	**Manuel Giffels (KIT)**	**05.04.2019** (kl. Hörsaal B)	**09:00 - 12:15 h** **13:30 - 16:45 h**

The Course aims towards Python beginners, which have either already done baisc scripting in Python or a good understanding of basic C++. Without going into too much details of the Python syntax itself, the course focuses more on introducing special language features and good coding practices (e.g. the usefulness of coding conventions). An overview over scientific libraries for data analysis will be given as well as a thorough introduction into object oriented programming with special emphasis on structuring analysis code. Finally, if time permits, modern techniques of software engineering such as unit-testing will be briefly touched.

Introduction and use of Raspberry Pi (broader) Theoreticians, exp., engineers	**B. Siebenborn (KIT),** **Ch. Heidecker (KIT)**	10.04.2019 11.04.2019	**09:00 - 12:15 h** **13:30 - 16:45 h**

The Raspberry Pi is a credit-card sized computer on a single chip which can be used in electronics projects, and for many of the things that your desktop PC does, like spreadsheets, word-processing and others. The course will give an introduction in the basic installation of the Raspberry Pi. Hands on experiments are aimed to deepen the understanding of the non-standard interfaces of the Raspberry like the GPIO, the SPI-and the Onewire-bus. Simple python scripts demonstrate how to use these hardware extensions in everyday life in the lab.

Introduction to string theory (broader) theoreticians	**Erik Plauschinn (LMU)**	10.04.2019 11.04.2019	**13:30 - 16:45 h** **09:00 - 12:15 h**

String theory replaces the notion of pointlike fundamental objects in nature by one-dimensional fundamental strings. Combined with the usual axioms of quantization and general covariance, this results in a perturbative interacting quantum theory free of ultra-violet divergences. Its low-energy limit includes massless spin-one and spin-two states, thereby unifying gauge and gravitational interactions in a consistent framework. Compactification of this necessarily higher-dimensional theory makes contact with modern concepts of geometry and provides links to particles physics, quantum field theory, quantum gravity, and mathematics.
The first part of these lectures will introduce the basic concepts of perturbative string theory, starting from the quantization of the classical string worldsheet action, including configurations with D-branes, and deriving the Hilbert space of states.
In the second part we will discuss aspects of the low-energy effective action and introduce some notions of compactification, time permitting with applications to particle physics.

Gamma-ray astronomy (deeper)	**Gernot Maier (DESY)**	15.04.2019 (room 3/1) 16.04.2019 (room 3/1)	**13:30 - 16:45 h** **09:00 - 12:15 h**

The course will cover an overview of the production and detection mechanisms and will focus on the most relevant aspects of gamma-ray astrophysics (leptonic/hadronic models, connection to neutrinos and cosmic rays, sources)

Scientific Journalism (better) all	**Ralf Krauter** **(Deutschlandradio)**	03.06.2019 (room will be announced)	**09:00 - 12:15 h** **13:30 - 16:45 h**

Communicating your scientific research to the general public (for instance in conversations with interested laypersons, public talks or media contributions) requires skills which are generally different from those which are honed through writing down your thesis work and presenting it to a scientific audience. This course is aimed at providing this specific skill-set, starting from considering a suitable language and wording. Through hands-on training you will find out how to identify key messages, get "to the point" and break down complex aspects to a more tangible frame. The course will consider both written texts and oral presentations/interview situations

Registration for this course until May 18

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