Advanced Lecture: Hadronic physics, Quark-Gluon Plasma and Nuclear Reactions

Hadronic Physics by Nicole d'Hose (NdH)
Hadronic physics studies how hadrons, among which protons and neutrons constitute 99% of the mass of the visible universe, are composed and acquire their properties in terms of quarks and gluons, the elementary fields of the Quantum Chromodynamics (QCD).
The Lectures will consist of 9 hours essentially providing an introduction to theoretical concepts and including many experiments that have played an important historical role or that will be performed in the near future.

Nuclear reactions by Guillaume Hupin (GH)
These lectures on nuclear reactions aim to give a 101 overview of the basic of non-relativistic quantum collisions. The specificities of studying nuclei with reaction will be thoroughly discussed particularly how information on structural properties of nuclei can be obtained or nuclear force or the huge diversity of nuclear phenomena stemming from a self-bound object subject to strong, weak and electromagnetic interactions.

Quark-Gluon Plasma by Zaida Conesa del Vallee (ZCdV)
The so-called Quark Gluon Plasma (QGP) is the state of QCD matter under extreme conditions of temperature and energy density, where the fundamental bricks of matter are not confined inside hadrons. These 9 hours of lectures will introduce the theoretical and experimental tools to study the properties of the QGP, together with a selection of the results.

Monday 24 February 2020, Bat 100, A015
Generalities from classical to quantum scattering (by GH)
Tuesday 25 February 2020, Bat 100, A015
Two-body quantum scattering (by GH)
Wednesday 26 February 2020, Bat 100, A018
The Quark Gluon Plasma: an introduction from QCD grounds (by ZCdV)
Thursday 27 February 2020, Bat 100, A015
Direct nuclear reactions Coulomb excitation, transfer (by GH)
Friday 28 February 2020, Bat 100, A015
Current Research on Few-body and ab initio approaches to reactions (by GH)

Monday 2 March 2020, Bat 100, A015
Evidence for the quark structure of hadrons and spectroscopy (by NdH)
Tuesday 3 March 2020, Bat 100, A015
Lepton-nucleon elastic scattering and the nucleon form factors (by NdH)
Wednesday 4 March 2020, Bat 100, A015
Heavy-ion collisions as a tool (by ZCdV)
Thursday 5 March 2020, Bat 100, A015
Deep inelastic scattering and the nucleon parton distribution functions (by NdH)
Deeply virtual Compton scattering and the generalized parton distribution functions
Friday 6 March 2020, Bat 100, A015
Selection of results: what we have learned about the QGP and how (by ZCdV)