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The HASPECT networking

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Fundamental interactions of components of matter are not yet fully understood. Some basic questions such as: how do the quarks, light constituents of the proton and neutron sum up to provide the visible mass of nucleons? Why the mediator of the strong interaction does not show up in the spectrum of hadrons? Are the three quarks and quark-antiquarks configurations the only possible? The answer to these questions requires a sophisticated procedure that involves both experiments and theories necessary to interpret data.
To face the challenge presented by new hadron spectroscopy experiments in which a huge amount of high-quality data will be produced, we need to develop a set of tools to optimize each step in the analysis. Data need to be collected, analyzed, transferred, accessed and stored in a convenient and accessible repository. Reconstructed four-momenta need to be feed to sophisticated partial-wave analyses that, making use of experimental and theoretical constraints, provide reliable results. Observables need to be compared to the best existing solution of the fundamental theory of the strong interaction provided by the Lattice-QCD and interpreted by using effective models that pick out the underlying dominant mechanisms of the theory. This complex analysis chain requires that the different skills and competences that are present in the hadron physics community be shared among groups and collaborations. Parallel computing, algorithmic optimization, cloud technology, massive data management, together with a thorough and well founded theoretical framework that can be used to analyze data require that experts share information and techniques to produce reliable results.
The goal of HASPECT networking is exactly to address this problem supporting exchanges and establishing links among these different communities, all involved in the same business: hadron physics laboratories in Europe (CERN, GSI, BONN, MAINZ) need to interact with their counterpart in US (JLab) and Asia (BESIII and Belle). The theoretical community needs to establish a contact with experimental collaborations that are performing the experiments and event-based analyses. Sophisticated computing techniques need to be merged with the specific requirements of a well-motivated and solid phenomenological scheme to perform high-level analysis necessary for physics interpretation. Senior scientists need to transfer their competences and their background to the new generation of researchers that will be the resource of the future.

Presenter: Dr BATTAGLIERI, Marco Andrea (Universita e INFN Genova (IT))

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