

6. Call for PostDoc Position in the area of Studies of jets and charmonia in heavy-ion collisions at the Large Hadron Collider

Post-doc position for one-year period from 1st January 2020

Research project

Heavy-ion collisions at the Large Hadron Collider (LHC) allow to study a hot and dense matter composed of quarks and gluons, which is often called quark-gluon plasma (QGP). The QGP is similar to a matter present in early stages of the evolution of universe. Studying QGP should bring better understanding to aspects of strong interaction that are currently not understood from the first principles, such as the transition from quarks and gluons to hadrons or collective aspects of strong interaction.

Two broad classes of phenomena were observed in heavy-ion collisions which can be highlighted. First of them are flow-like phenomena which are observed as significant azimuthal anisotropies of soft particle production. The flow phenomena are universally present in proton-proton, proton-ion, and ion-ion collisions. Flow phenomena are related to collective aspects of strong interaction and are most commonly modeled using tools of relativistic fluid dynamics. Second class of phenomena are quenching phenomena which are observed as significant suppression of production of high transverse momentum jets (collimated showers of hadrons) and various particle species. The quenching phenomena persist to unexpectedly high energies of a TeV scale and reflect the microscopic parton dynamics. More recently, LHC energies also brought possibility to study processes in electromagnetic interactions of ultra-peripheral heavy-ion collisions. This brought the first direct observation of the light-by-light scattering and allowed putting more stringent limits to production of axions, new hypothetical particles predicted by some of theories aiming to address physics beyond the Standard model of particle physics.

The team at Charles University works on analyses mainly involving jets and charmonia using data from the ATLAS experiment. In the past ten years, the team has lead or significantly contributed to several key measurements in the field of heavy-ion collisions done using ATLAS, namely measurement of the dijet asymmetry, measurements of the inclusive jet production, and measurements of the jet fragmentation. The team also works on phenomenological modeling of jet quenching and charmonia suppression as well as on developing new methods for efficient mitigation of large backgrounds present in both proton-proton and heavy-ion collisions at the LHC.

The candidate is expected to contribute to the phenomenological modeling of jet quenching and/or charmonia suppression as well as to the effort of analyzing the data from the ATLAS experiment. The

candidate is expected to have a PhD degree in the field of high-energy physics or high-energy nuclear physics and good programming skills in C++ and Root.

Applicants should submit:

- [Application Form](#)
- [Letter of Reference](#)
- Detailed CV
- List of publications
- Copy of university diploma

Contact person: doc. Mgr. Martin Spousta, Ph.D., Charles University, Faculty of Mathematics and Physics, Institute of Particle and Nuclear Physics

E-mail: Martin.Spousta@mff.cuni.cz

Deadline date: July 15, 2019

Position available from: January 1, 2020

Submit applications with all other documents to doc. Mgr. Martin Spousta, Ph.D.:

Martin.Spousta@mff.cuni.cz.