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A Framework for Interdisciplinary Research in High-Energy and Nuclear Physics

The intersection between high-energy and nuclear physics has been growing in recent times. As an early career nuclear physicist, I am excited by the prospect of employing detector technologies and analysis techniques established in high-energy physics at future mega-nuclear physics facilities such as the electron-ion collider (EIC). Fast-time pixel or strip AC-LGAD sensors, as well as the associated front-end electronics and the FELIX read-out board, have the potential to be used in nuclear physics investigations. Furthermore, tools developed for jet substructure analysis and techniques based on machine learning can be used to improve the precision of measurements in nuclear physics. In exchange, the community of nuclear physics can help improve the precision of the parton distribution functions (PDFs), which are crucial in both high-energy and nuclear physics. With the timeframe in mind, the next big nuclear physics facility, EIC can also provide a platform to efficaciously demonstrate several technologies aimed at high-energy physics experiments for the first time. While there is no official structure in place to facilitate collaboration between the two fields, it is critical to establish a framework for interdisciplinary research in order to capitalize on the strengths of each field and make significant progress in our understanding of the fundamental particles and forces. This can be accomplished by organizing joint conferences and workshops, funding interdisciplinary research, developing joint training programs, and encouraging more dialogue and collaboration on projects of mutual interest between the “office of nuclear physics” and the “office of high energy physics” within an official framework.

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