

ID: 7.0f

Title: UNEDF: Advanced Scientific Computing Collaboration Transforms the Low-Energy Nuclear Many-Body Problem

Name: Nam, Hai Ah

Affiliation: Oak Ridge National Laboratory

The demands of cutting-edge science are driving the need for larger and faster computing resources. With the rapidly growing scale of computing systems and the prospect of technologically disruptive architectures to meet these needs, scientists face the challenge of effectively using complex computational resources to advance scientific discovery. Multi-disciplinary collaborating networks of researchers with diverse scientific backgrounds are needed to address these complex challenges. The UNEDF SciDAC collaboration of nuclear theorists, applied mathematicians, and computer scientists is developing a comprehensive description of nuclei and their reactions that delivers maximum predictive power with quantified uncertainties. This paper describes the UNEDF collaboration and identifies attributes that classify UNEDF as a successful computational collaboration. We illustrate significant milestones accomplished by UNEDF through integrative solutions using the most reliable theoretical approaches, the most advanced algorithms, and leadership class computational resources.