CEF4 LOI-8

Enhancing Physics Education Opportunities in K/12, particularly in the early grade levels.

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Abstract:
To develop an increase in societal interest in the fundamental sciences – and particularly for maintaining the support structures needed to succeed in experiments that take several decades to develop and complete - requires strong educational backgrounding at all levels of the instructional system – and notably at early stages in the process.

While many (particularly young) students might show an early interest and aptitude for science and mathematics at the elementary level, the structures are not necessarily in place to capture, nurture and develop such nascent interests. In the world of competitive sports, coaches at all levels are aware of who are the potentially star athletes coming up through the system from early ages on through high school and college. It would seem that such a model might prove useful in guiding teachers at all levels to be aware of students coming up through the education process that show promise as potential scientists, engineers and technologists.

To encourage and strengthen such interests, the academic system should have strong connections at each level, K/5, Middle School 6/8 and High School 9/10. This will require careful study and backgrounding in this domain which is typically outside the view of Particle Physicists who are involved in education at the undergraduate, graduate and postdoctoral levels. Experts at the high school level (for example QuarkNet teachers and other master teachers) will be essential to the creation of ideas and approaches, and to help guide developments in this important and critical domain.

The objective of this LOI is to identify potential courses of approach and action to engage and sustain the interest of young students in science and technology to the betterment of society and fundamental science.

Possible Approaches:
1. The nature of the problem: With the help of statistics from APS/AIP and others, what are the challenges for engaging students at the early levels of K/12 education?
2. A needs analysis from the teachers' perspective: Develop a needs analysis for the K/12 Education Community to help strengthen the scientific background of and/or provide needed support and resources for Elementary Teachers.
3. Community building and Mentoring: Develop mentoring approaches for teachers in the K/12 domain. Does a school coaching model represent a workable methodology to build community for teachers?
4. HEP engagement in the process: How do particle physicists (and other research scientists) engage with teachers and students at these levels.
5. Model development and testing: Can a test model (or models) be developed that could be tried over the course of the next two decades that could represent paradigms for progress?