

## **Proposal to establish a National Instrumentation Award for Excellence in Instrumentation Development for Particle Physics Experiments**

Experimental advances in particle physics are driven in part by developing new experimental techniques and by applying known techniques to new uses. Nonetheless, excellence in instrumentation development is not universally recognized and rewarded, for example in advancement in University or Laboratory careers. We recommend establishing a DPF award in the general area of particle physics instrumentation R&D in order to better recognize and reward instrumentation development.

In reaching our conclusion, we considered how such work has been recognized. The Panofsky prize has been awarded 6 times for instrumentation development, broadly defined: Willis for liquid argon calorimetry, transition radiation, and hyperon beam development; Nygren for the TPC; Cassidy and Sokolsky for atmospheric fluorescence detection; Menzione and Ristori for silicon strip detectors; Oddone for the asymmetric  $e^+e^-$  collider; and Grannis for the D0 detector. The Nobel prize in physics has gone to Glazer for the bubble chamber, Charpak for wire chambers, Alvarez for the application of bubble chambers for discovering particle resonances, Lawrence for the cyclotron, van der Meer and Rubbia for the SPPS and the UA1 detector, and Blackett for developing the Wilson cloud chamber (Wilson got the prize with Compton for observing Compton scattering). We conclude that inventing or developing detector (and accelerator) techniques, adapting known techniques to execute important experiments, and applying a variety of techniques to develop a complicated and very successful major detector system is recognized and rewarded. The examples given above show that prizes are generally given for instrumentation that has been used in important particle physics experiments and usually to relatively senior people in the field.

We recommend establishing a new award to encourage and reward physicists early in their careers who work in the area of detector development. It could, for example, be given to recognize *development of new detector techniques or innovative applications of known techniques to an important experiment*. The DPF could implement a preference for an early career award by imposing an age limit or restricting the reward to non-tenured faculty or laboratory or research lab physicists with a similar non-permanent position, if such a restriction is allowed and does not overly restrict the candidate pool. If these problems do arise, we would consider requiring that the award to be given within a short time following the work for which the prize is given. We recommend that we establish a *substantial award* rather than a prize. First, we have the Panofsky prize, which has been awarded regularly for detector development, but typically to relatively senior people. We don't see the need to duplicate the recognition that the Panofsky and Wilson prizes afford. Second, it may be easier to fund an award, which does not require a \$250k endowment. Third, establishing an award would not set the bar so high (equivalent to the accomplishments recognized by Panofsky, Wilson or Sakurai prizes) that it would be difficult to make an award each year.