Neutrinos are complicated little beasties—far more so than physicist Wolfgang Pauli could have imagined. He introduced them in 1930 as a theoretical hack to save the law of conservation of energy, which appeared to be violated in some newly observed particle interactions.

Despite such an inauspicious beginning, the neutrino has risen to the status of particle physics' wonder-child. Nine of the thirteen most-cited papers in experimental high-energy physics concern neutrinos. Physicists have learned much about these creatures but the mysteries only seem to deepen with each new finding.

It should be no surprise that there is so much activity surrounding neutrinos. After all, they fracture the Standard Model of particle physics and interactions. The Model did not predict flavor change and non-zero masses, for example. Fortunately, neutrinos are accessible for study by new, albeit challenging, experiments.

The recent American Physical Society study, *The Neutrino Matrix,* provides a thorough analysis of the current state of neutrino physics, and makes a set of three specific recommendations on what would best advance the field.

This issue of *symmetry* focuses on aspects of neutrino physics, including experiments that dovetail with two of the *Neutrino Matrix* recommendations. These experiments attempt to answer: "What kind of particle is the neutrino?" and "How can neutrino masses be characterized?"

The promise of neutrinos is enticing. Their as-yet-unrevealed secrets could provide solutions to why there is more matter than antimatter in the universe, how mass comes to exist in our universe, and the origin and future of the sun's energy. Neutrinos are also driving more speculative ideas about the nature of dark energy and extra dimensions.

Having broken the Standard Model, can neutrinos also provide seeds for its next evolution? That seems likely. But, for now, theorists have more ideas than they know what to do with, and need experimental results to direct them toward resolution.

It is clear that neutrino physics has much to teach us about the universe. And these lessons far surpass the original promise of fixing a perceived accounting problem in the energy balance sheet of fundamental interactions.

David Harris
Editor-in-Chief

Symmetry
PO Box 500
MS 206
Batavia Illinois 60510
USA

630 840 3351 telephone
630 840 8780 fax
www.symmetrymagazine.org
mail@symmetrymagazine.org

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