The Physics of Neutrinos

George Fuller
Distinguished Professor, Physics and Director of Center for Astrophysics and Space Sciences (CASS)

CURRENT RESEARCH

Understanding the role of neutrinos in cosmology and fundamental physics

Researchers believe that elements like iodine which are the basis of some of the chemical makeup found in our body and other heavy elements like gold and uranium are created in very dense environments, such as core collapse supernovae and neutron star collisions. However, there is still much that is mysterious about the origins of these elements. Researchers have now discovered that these key building blocks of life are made of the "star stuff," cooked in the furnaces of massive collapsing and exploding stars under the influence of the physics of elementary particles like neutrinos. "Neutrinos" are subatomic particles that comprise a part of the universe, and the physics of neutrinos plays an important role in helping researchers understand fundamental physics of the quantum world. Dr. George Fuller at the University of California, San Diego studies the general field of nuclear and particle astrophysics, specifically the central issues in neutrino astrophysics, the early universe and cosmology, and core collapse supernovae. Tackling fundamental issues in quantum mechanics and gravitation, Dr. Fuller and his graduate students do both "analytic" theory and large-scale supercomputer simulations.

Another vision of Dr. Fuller's research is in training frontline theoretical physicists. Over the past few years, Dr. Fuller has established a track record of cultivating many excellent students who have become prominent researchers in their fields. Most of his former graduate students are still working in astrophysics and physics; one student is Professor of Physics at University of California, Irvine, another student has become a professor at the University of Montpellier in France, another a professor at North...

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AFFILIATION

University of California, San Diego

EDUCATION

- Ph.D. in Physics 1981,Graduate student at California Institute of Technology
- B.S. in Physics 1976,California Institute of Technology

AWARDS

- Hans A. Bethe Prize, 2013

RESEARCH AREAS

Technology, Computational Sciences / Mathematics, Materials Science / Physics, Space

FUNDING REQUEST

Dr. George Fuller's research group is a leader in the field of neutrino astrophysics and cosmology, uniquely covering a large range of techniques and topics in physics - from issues in the elementary particle physics of neutrinos to fundamental quantum mechanics, to supercomputing, all the way to stellar evolution and observational cosmology. Your donations will contribute to the $500K/year required to support talented students and researchers who are furthering fundamental sciences on the forefront.