



# Dark Matter Science: Early experiments and the role of Ron L. Brodzinski at PNNL

Monday, June 18, 2012 | 4:00 pm  
Battelle Auditorium

Dark matter and dark energy constitute approximately 95% of the mass of the universe and yet it is an unknown entity. Unambiguous direct detection of cosmological dark matter particles is, perhaps, the single most pressing particle astrophysics measurement sought by cosmologists and theoretical particle physicists alike. Dark matter is entirely invisible to our telescopes measuring the electromagnetic spectrum from radio frequencies, through the visible spectrum, and up to gamma rays. The gravitational effects due to the mass of dark matter appear in deviations from uniform intensity of the cosmic microwave background radiation, the dynamics of galactic clusters, gravitational lensing, and the rotation of galaxies.

The year 2012 marks the 25th anniversary of the publication of results from the first terrestrial direct search for cold dark matter. This seminal experiment was a collaborative effort between Pacific Northwest National Laboratory, the University of South Carolina, Harvard University, Harvard Smithsonian, and Boston University. The late Dr. Ron Brodzinski, a PNNL Laboratory Fellow, was a co-author on the seminal experimental publication. This talk will briefly discuss the science of dark matter, examine the early and current dark matter experiments, and the prospects for the imminent detection of this elusive dark matter.

## Dr. Frank Avignone

Dr. Frank T. Avignone III, Carolina Endowed Professor of Physics and Astronomy at the University of South Carolina (USC). After receiving his Ph.D. from the Georgia Institute of Technology, Dr. Avignone joined the faculty at USC in January 1965, and served as chair of the Department of Physics and Astronomy from 1979 until 1998. In 2004 he was awarded an honorary doctoral degree (Honoris Causa) by University of Buenos Aires, and in 2010 the University of Zaragoza in Spain awarded him his second Doctor Honoris Causa degree.

Dr. Avignone's research interests lie in experimental elementary particle physics with emphasis on neutrino oscillations, neutrino-nucleus cross sections, neutrino-less double beta decay, searches for cosmic dark matter candidates and solar axions. He was the Spokesman of the DEMOS Cold Dark Matter Search, the SOLAX search for solar axions, International Coordinator of the IGEX 76GE double beta decay experiment and the COSME dark matter search, and is a Task Leader in both the MAJORANA and CUORE neutrino-less double beta decay experiments.



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