

The ghostbuster

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In July 2005, Dr. William F. McDonough authored a seminal article for the News & Views section of Nature, entitled "Ghosts from within," which introduced a pioneering report by the KamLAND collaboration on the first experimental evidence of geoneutrinos. With a prescient vision, he heralded this discovery as "a landmark result," highlighting how by measuring antineutrinos from the progenies of uranium, thorium, and potassium "the fractional contribution of radioactive heating to the total energy budget" of the Earth could be directly investigated.

Following that publication, Bill McDonough devoted a considerable segment of his career to the detailed study of geoneutrinos. By advancing models to map the distribution of heat-producing elements in the lithosphere and the Earth's mantle, his meticulous work has refined the estimates of expected signals in past (Borexino), current (KamLAND), and forthcoming (SNO+ and JUNO) experimental geoneutrino measurements.

Over the last two decades, he has tirelessly worked to build and bridge an interdisciplinary scientific network between the communities of particle physicists and Earth scientists, fostering a unique confluence where paradigms and methodologies from these fields converge in the study of geoneutrinos. His infectious enthusiasm for geoneutrinos has inspired hundreds of young researchers and scientists, fueling a vibrant scientific community dedicated to unveiling the secrets of the Earth's interior through the lens of particle physics.

The seminar aims to sketch the extraordinary scientific trajectory of Bill McDonough in the field of geoneutrino science. A "ghostbuster" of these elusive particles, he has dedicated himself to capturing their messages for Earth science.