Queen's physicist 1st Canadian to win top Russian science prize

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Queen's University Physics Professor Art McDonald is the first Canadian to win the prestigious international Bruno Pontecorvo Prize in elementary particle physics, Russia's top award in this field. Introduced in 1995 shortly after the death of renowned nuclear physicist Bruno Pontecorvo, the prize is awarded annually by Russia's Joint Institute for Nuclear Research to a single scientist for valuable scientific work in elementary particle physics.

Dr. McDonald and his Sudbury Neutrino Observatory (SNO) team are recognized this year for solving the longstanding puzzle of the "missing solar neutrinos" by showing that neutrinos (sub-atomic particles considered the basic building blocks of the universe) change from one type to another on their journey to earth from the sun. The results from the SNO experiments are helping answer questions about the nature of matter at the smallest scale, and providing insight into the structure of the stars and the universe as a whole.

And there's a little-known connection that makes this achievement even more remarkable. The famous scientist for whom the Russian prize is named not only worked decades earlier at the same Canadian research facility as Dr. McDonald, he laid the groundwork for the Queen's physicist's landmark discovery.

"This prize is particularly significant for us because it was Bruno Pontecorvo who first proposed that neutrinos from the sun might change to other types before reaching the earth," explains Dr. McDonald, leader

of the international team that developed the neutrino observatory. “SNO’s measurements have confirmed this, changing the fundamental laws of physics and validating the detailed theories of energy generation in the sun.”

The theory behind this discovery – which transformed the standard model of elementary particle physics – was first proposed in the late 1940s by the Italian-born Pontecorvo when he was conducting research at Canada’s Chalk River Nuclear Laboratories north of Pembroke. In the early 1950s Pontecorvo moved to England and subsequently to Russia, where he is revered as one their top scientists.

Dr. McDonald also worked as a research scientist from 1969 to 1981 at the Chalk River facilities, owned by Atomic Energy of Canada Limited (AECL). In 1981 he joined the Physics Department at Princeton University, and in 1989 moved to Queen’s as Professor of Physics and director of the newly-created SNO Institute.

The Pontecorvo Prize is the third major science award in the past two years to be won by the SNO director. In 2003 he received both the Gerhard Herzberg Gold Medal, presented by Science and Engineering Research Canada (NSERC) to the country’s top scientist, and the Tom W. Bonner Prize in Nuclear Physics from the American Physical Society, for outstanding experimental research. In both 2001 and 2002, SNO discoveries were ranked among the top 10 in the world by the prestigious international journal Science.

Source: Queen’s University

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