

VII Antonio Barone Lecture

12 novembre, 16.30 - Aula Rossa Monte Sant'Angelo

Prof. Arthur B. McDonald

2015 Nobel Laureate - Queen's University, Kingston, Ontario, Canada

Understanding the Universe from Deep Underground

By going deep underground and creating ultra-clean detectors it is possible to address some very fundamental questions about our Universe: How does the Sun burn? What are the dark matter particles making up 26% of our Universe? What are the properties of neutrinos, elusive particles that are one of the fundamental building blocks of nature? How do these particles influence how our Universe evolves? With the Sudbury Neutrino Observatory (SNO) we went 2 km underground to observe new properties of neutrinos that are beyond the Standard Model of Elementary Particles and also confirm that the models of how the Sun burns are very accurate. Through the Global Argon Dark Matter Collaboration, involving the Gran Sasso (Italy), SNOLAB (Canada) and CANFRANC (Spain) underground laboratories and more than 400 international scientists, we hope to push the sensitivity for detecting Dark Matter particles by more than a factor of 100 and perhaps observe a whole new type of matter. The collaboration is working towards the immediate deployment of a dark-matter detector called DarkSide-20k, relying on a target made of 20 ton ultra-pure argon from underground sources and novel technologies. This experiment and its successor, with a ten times bigger liquid argon target, promise the most complete exploration of the mass/parameter range of the present dark-matter paradigm.



Arthur B. McDonald is a native of Canada with physics degrees from Dalhousie (BSc, MSc) and Caltech (PhD). He has worked at Chalk River Labs, Princeton University and Queen's University where he is now Gray Chair, Emeritus. He has been Director of the SNO Scientific Collaboration since 1989 and has received many awards with them, including the Pontecorvo Prize, Cocconi Prize, 2015 Nobel Physics Prize and 2016 Breakthrough Prize. He continues to be active in basic research in Neutrino Physics and Dark Matter.

The lecture will be introduced by:

Prof. Gaetano Manfredi, Rector of the University Federico II,

Prof. Piero Salatino, President of the Polytechnic and Fundamental Science School

Prof. Leonardo Merola, Director of the Department of Physics Ettore Pancini

Prof.ssa Giuliana Fiorillo, responsabile italiano esperimento DARKSIDE

The Antonio Barone Lectures are organized by the Department of Physics Ettore Pancini of the University Federico II in Naples to honor the memory of Antonio Barone (1939-2011) who was a professor of the department until 2009. Antonio has been amongst the pioneers of superconductivity and a world leader on the Josephson effect. More than 200 students graduated under his supervision.

