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Going underground to look at the Sun: recent results on solar neutrinos by Borexino

Since they barely interact with matter, neutrinos are ideal messengers to investigate the inner processes of astrophysical objects. Solar neutrinos are produced in the Sun as a consequence of the nuclear reaction which take place in its core. Therefore, a detailed study of solar neutrinos is bound to provide
unique direct information on stellar interior, as well as validity of existing theoretical models for the structure and evolution of the Sun and other stars. Solar neutrinos offer also unique chances for studying neutrino particle physics through the observation of solar neutrino oscillations.
Being very elusive particles, large and radiopure underground detectors are required to observe solar neutrinos: cosmic rays and natural radioactivity can in fact easily mimic their rare signal.
Borexino is a liquid scintillator detector designed to perform sub-MeV real-time solar neutrino spectroscopy and it is taking data since May 2007. The key feature of Borexino is the unprecedented low background level, obtained thanks to its location deep underground at the Gran Sasso National Laboratory (Italy) and to the extremely high radiopurity of detector materials. So far, Borexino is the only detector capable of observing the entire spectrum of solar neutrinos simultaneously. In this contribution, the Borexino experiment will be described, together with its latest results on solar neutrinos.

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