Borexino: first real-time detection of sub-MeV solar neutrinos

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Borexino is an ultra-low background experiment for spectroscopy of low-energy neutrinos. The primary physics goal is the real time detection of the ^{7}Be, *pep* and CNO solar neutrinos fluxes with energies below 2 MeV. Borexino is aiming at observing anti-neutrinos from the Earth's crust. A fundamental problem in the observation of sub-MeV neutrinos is that of the traces of radioactive isotopes present intrinsically in nearly all materials. Borexino is a pioneer in achieving unprecedented low levels of radioactive impurities. Strategies to combat radioactivity include (but are not limited to) the principle of graded shielding, materials screening, clean room assembly, radon filtering, use of purification plants, and discrimination between the scintillation pulse shapes of alpha particle and electron-induced events. Armed with these tools, Borexino has recently made the first observation of the 862-keV neutrinos formed in the ^{7}Be side branch of the pp solar fusion cycle, which represent about 10% of solar neutrino output. This talk will discuss some experimental details that have permitted us to meet this goal, and will put the Borexino result within the framework of current models of neutrino and solar physics.