BOREXINO is one of the world's most sensitive neutrino detector with very unique capability of registration in real time of low energy neutrinos. It is possible because of unprecedented radio-purity of the applied detection medium: organic liquid scintillator produced from oil extracted from a deep underground source. It contains 11 orders of magnitude less radioactive isotope than e.g. mineral water. BOREXINO is working since May 2007 in the Gran Sasso underground laboratory in Italy and delivered so far information about almost entire solar neutrino spectrum (except *CNO* neutrinos), as well as about geo-neutrinos. Geo-neutrinos are electron anti-neutrinos produced in radioactive decays of isotopes present in the Earth.

The results obtained in the experiment are published in the best scientific journals (Science, Nature, Phys. Rev. Lett., Phys. Lett. B, Phys. Rev. D, Phys. Rev. C) with hundreds of citations. They are also presented at the most recognized conferenced devoted to neutrinos and astrophysics (Neutrino or TAUP). The importance of the project, as a leading in the field of neutrino physics was recognized by many famous physicists (Bahcall, t'Hoof, Higgs, Tannenbaum, Minkowski, and the Noble prize winner A. McDonald). BOREXINO is also associated with CERN (code RE26).

One of the most important achievements of BOREXINO is direct detection of the solar *pp* neutrinos in real-time. The measurement was described in Nature and it confirmed that 99 % of the solar energy is produced in the so-called *pp* cycle, where hydrogen is burned into helium. Because of their low energies, it is extremely difficult to detect the pp neutrinos, but they are a unique source of information about the speed of the thermonuclear reactions taking place in the core of the Sun.

Presently the BOREXINO team is working on detection of neutrinos from the *CNO* energy production cycle, which is of great interest for bigger stars. We want to also search for a new neutrino family, namely sterile neutrinos by applying a very strong artificial source of (anti)neutrinos. The measurement of the *CNO* neutrino flux, even more challenging than measurement of the *pp* neutrinos, will also help to solve the Sun's metallicity problem (abundances of elements heavier than He). An experiment with the neutrino source will provide an answer to the question about the existence of the new neutrino family. It will be also possible to investigate the differences in oscillations of the neutrinos and anti-neutrinos, thus the CPT symmetry. This is of fundamental importance for particle physics.

BOREXINO is also measuring continuously the flux of geo-neutrinos. They are very important because may allow to establish the content of uranium and thorium in the Earth crust and mantle. Obtained results will be very helpful in establishing an earth model, especially model of the generation of the terrestrial heat. BOREXINO will provide thus very important contribution to the geophysics.

In the frame of the presented project we plan to complete tasks, which aim for an improvement of the detector sensitivity through further reduction of residua background and its understanding. The most disturbing signal comes from the radioactive decays of ^{210}Po, ^{210}Bi and ^{11}C. Presently, they limit our ability to measure the CNO signal and limit the precision of the measurements of the ^{7}Be, ^{8}B and *pep* neutrino fluxes.