

Review of the “EDELWEISS-LT project”

The description is detailed and contains the essential information about the project. The experiment EDELWEISS has carried on direct search for Dark Matter for more than 20 years. It uses high purity germanium detectors (HPGe) at cryogenic temperature (~ 20 mK), located about 1800m underground in the Laboratoire Souterrain de Modane (LSM). Such detectors can disentangle between the nuclear recoil caused by WIMP or neutron and electronic recoil induced by β^- or γ^- radioactivity. Each stage of the experiment follows the development of the detector technology and improves the sensitivity of the experiment. The EDELWEISS-LT project will search for DM particles in forms of "light" WIMPs in the mass range $0.1 - 6$ GeV/c² range, down to cross-sections where the search will be limited by the irreducible background from the coherent nuclear scattering of solar neutrinos. This will be achieved using the biggest array of HPGe bolometers (20kg total mass) with internal amplification of the heat signal based on Neganov-Luke effect. An R&D is ongoing to improve the energy resolution for both heat and ionization signals to reach a value of 100 eV. New type of transistors (High Electron Mobility Transistors (HEMT) instead of Junction Field Effect Transistors (JFET) will be used for the ionization signal and new thermal sensors for the heat. The experiment covers completely the region of positive CoGeNT results obtained on the same nuclear (Ge).

The JINR group is responsible for the radon/neutron/alpha detectors – their development, operation, maintenance, data acquisition, monitoring and analysis of data. The group developed low energy particle generator including all atomic processes in low energies (Auger, Coster-Kronig transitions, X-rays) crucially important for background model at DM search region. Another responsibility of the JINR team is the data analysis of EDWIGE branch of EDELWEISS. The group plans to continue these activities for the next stage of the experiment. In the period 2016-2018 the experiment published 6 articles in high impact journals. In addition, the members of the group published 4 articles on the R&D results.

The group consist of 7 researchers and 4 engineers, however the FTE of the researchers is only 2.3, while for the engineers it is 2.7. There seems to be a problem of the classification since one of the engineers defended PhD thesis in DM physics. In my opinion the number of FTE for the research staff should be higher for an efficient collaboration. There were two presentation at conferences in the period 2016-2018, which is on the low side. There is one DSc defense in preparation in addition to the mentioned PhD thesis.

The requested budget for 2019 is 76 k\$ and matches the activities of the group within the EDELWEISS-LT project, however the travel costs of 20 k\$ is probably on the low side.

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