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Ultimate DM detector (for $5\ \mathrm{Gev}/c^2 < M_{DM} < 15\ \mathrm{GeV}/c^2$).

We disclose an implementation of RT-bolometers which comprise high chemical-energy materials, *e.g.* explosive and {catalase, H_2O_2}-system, that can be operated at temperature between 4 ºC and room temperature (RT). Energy deposited by the incident particle to the nuclei can trigger a local release of chemical energy;. The energy release in such a `nano-explosion’ indicates that a scattering event has taken place and allows for the localization of this event;

Such bolometers offer several advantages:

(1) they can operate at ambient conditions, *i.e.* the ignition temperature of the selected thermal run- away process can be close to be either 4 ºC or RT;

(2) the specific heat is of the order of 10^{-5} keV/(nm^{3}K);

(3) materials compatible with chemical amplification allow for reasonable scattering rates even for weakly interacting particles (neutrino/DM candidates);

(4) the read-out signal can be amplified and high resolution localization is possible.

(5) the released energy is orders of magnitude larger than the energy deposited by the particle, which enhances the ability to detect a single scattering event and improves the sensitivity of the technique

For DM detection {catalase, H_2O_2}-system is preferred, wherein we need to know the activity *vs.* temperature curve. There are many catalases, which have maximum activity at temperatures from about 10 ºC to about 90 ºC. The width of the activity peak is from 10 ºC at RT to about 20 ºC at high temperature This permits to optimize enzymatic reactions and is influencing the read-out design. {catalase, H_2O_2}-system works because the range of recoiling nuclei is so short that most of the energy is transferred in a single “voxel” called “vertex”, leading to a very large local temperature increase.

When neutrino scatter on nuclei the majority of the recoil nucleus energy is transferred to the lattice, which leads to the creation of ballistic phonons. They rapidly thermalize and increase the grain temperature. For $5\ \mathrm{Gev}/c^2 < M_{DM} < 15\ \mathrm{GeV}/c^2$ the energy of the recoiling nuclei is 0.5-2.0 keV and all this energy is deposited within a few nano-meters. Thus, the $dE/dx = O(0.1\ \mathrm{keV/nm})$ is deposited in the vertex, *i.e.* in the grain with which neutrino interacts there is a change of state. The energy deposition is much smaller in the case of single charged, relativistic particles, which have a range of hundreds of μm in materials with d O(1 g/cc) and corresponds to $dE/dx < 1$ eV/nm. Even for alpha particles, dE/dx is < O(5 eV/nm). Energy deposited should be compared to the energy necessary to change the state, which is proportional to the volume of the grain, thus detection of single charged particles and alpha particles is highly suppressed due to the large difference in dE/dx.

We developed a very efficient read-out for such detectors . The expected detector cost is low, ca. $50,000 per ton. The deployment will be deep underwater, say at Marina Trench at depth of 11 km.

We consider the deployment of prototype detector at Baikal Lake.