

ROSEBUD EXP-02-2008

Numerous astronomical observations have produced a model of the Universe in which dark matter particles are an important component (about one third of the Universe). Their detection and identification is one of the big challenges for cosmology, astrophysics and particle physics. ROSEBUD (Rare Objects SEarch with Bolometers Underground) is a collaborative effort between the Institute d'Astrophysique Spatiale (IAS, Orsay, France) and the University of Zaragoza (Zaragoza, Spain) started in 1999 and presently focused on the development of prototypes of scintillating bolometers for dark matter direct detection. Prototypes are tested first at IAS and then at the Canfranc Underground Laboratory where they are shielded by the rock (equivalent to 2450 m of water) against cosmic radiation. The detectors are small scintillating crystals of different materials (BGO, sapphire, LiF, etc) operated at temperatures a few mK in a double bolometer configuration (see Figure). Heat produced by the particle interaction in the crystal is measured with a thermal sensor and scintillating light produced by the particle is measured in a small Ge disk looking at the scintillating crystal inside a reflecting cavity. This simultaneous measurement of two magnitudes allows identification of the particle that produces the interaction increasing sensitivity of experiments.



Figure: A 46 g BGO bolometer (right) shown separately with the Ge disk used as optical detector (left).

The infrastructure (“hut”) to install ROSEBUD has been built. Its walls have been internally covered with copper sheets and acoustic insulation. The installation of the cryostat is being done.

