

UNDERGROUND LABS and SPACE

Experiment or Program Name: Principal Investigator or Contact Person: Brief Summary:

1) Title of your proposal, -

Low-Alpha Lead and the Cosmic-Ray Equivalency Factor

2) List of participants (a partial list is fine)-

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3) A brief description of your proposed program-

Modern high speed, high-density computer memories are subject to random errors (soft errors) that are produced by cosmic rays or through emissions (alpha particles) from radioactive impurities in the electrical contacts (solder bumps). Therefore, it is essential that the lead used in solder bumps be very pure and virtually free of alpha particle emissions. This lead is known as low-alpha lead (LAL). It is difficult and time consuming to certify the activity of LAL, and low background detectors must be used. One such detector is a low background gross alpha particle counting detector produced by Palm Leaf Products, Inc. We propose to determine the effect of cosmic rays by measuring LAL in the presence of cosmic rays (at the surface of a deep mine) and in the absence of cosmic rays (deep underground) us such a detector or a similar one.

4) A rough estimate of your space requirements and specific or unusual technical issues involved in your proposal-

A background counting laboratory ($\approx 15\text{m}^3$) at ground level and a background counting laboratory (again $\approx 15\text{m}^3$) at the 4850 ft level are requested. Capability to access acquire data stored in an onsite computer via the internet is required.

5) An estimate of when you will require access to the underground facility-

Counting periods of up to three weeks at each level is anticipated beginning in June 2007.

6) Any other general requirements or questions for the experiment, research, or outreach activities.

Minimal 120 V 60 Hz power (≈ 2 kW) to operate the detector and data acquisition equipment is anticipated. Access to the internet is also required.

Note: General requirements and lab module infrastructure for physics and earth sciences experiments have been compiled for DUSEL planning (ref [http://llwHvv.dusel.org/fn\(rastrhvltrices.rev.xls\)](http://llwHvv.dusel.org/fn(rastrhvltrices.rev.xls))). As-needed, use this checklist to add, update, or modify information for the proposed experiment.

