

Dear Homestake Collaboration,

Welcome to the November 2010 monthly newsletter for Homestake DUSEL and South Dakota's Sanford Laboratory. We gladly receive your input on news, links to news articles, upcoming workshops, conference notices, scientific updates, information concerning the Collaboration, employment opportunities, and other highlights relevant to our shared goal.

Important Dates

December 12: DUSEL BGE meeting – San Francisco (in conjunction with the AGU)

December 14-15: NRC DUSEL Science Assessment Committee – Washington, DC

December 20-21: Preliminary Design Report, Cost & Schedule PDR – Berkeley

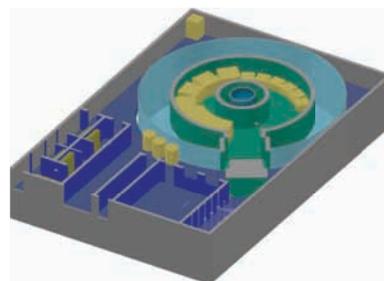


Figure 1: Conceptual design of FAARM

The latest conceptual design for FAARM, a torus shaped laboratory inside a large water tank (Figure 1), was presented by L. Petersen (FAARM Contract Engineer) and P. Cushman (FAARM PI). Results from site characterization (gamma and neutron measurements) were reported by collaboration members from the University of South Dakota. Onsite Sanford Lab staff reported on the latest underground radon monitoring results. Future plans for muon and neutron flux measurements and instrumentation R&D were presented by members of the USD team.

AARM Collaboration Meeting

On November 12-13, the AARM (Assay and Acquisition of Radiopure Materials) Collaboration held their collaboration meeting at Sanford Laboratory.

The meeting focused on several important topics: to review the latest progress in designing the underground low-background counting facility, FAARM, to report the latest results on site characterization, and to discuss plans for an early low-background screening program that could benefit future Sanford Lab and DUSEL experiments (before the large FAARM facility will be built underground). In addition to members of the collaboration, AARM invited representatives from members of the Integrated Suite of Experiments (ISE) to attend the meeting and to participate in the discussions.

The meeting began with an update on the status of DUSEL PDR from Steve Marks (UC Berkeley).

ISE members, including 1TGe, COUPP, Ecohydrology, DIANA, GEODM, LZD, MAX, etc. presented the scientific goals of their experiment and outlined their expected requirements in low-background screening for the future. Facilities such as SNOLAB and the Berkeley Low Background Facility (LBNL) reported their sample screening through-put capabilities over the years. Other experiments such as DEAP/CLEAN also presented their general needs for low background counting.

A plan for hosting a simulation workshop on experimental backgrounds for Sanford Underground Laboratory/DUSEL experiments was discussed as well.

The meeting was organized by Prof. K. Keeter from Black Hills State University.

Meeting with UC Board of Regents

On November 17, Kevin Lesko and Kem Robinson met with The Regents of UC in San Francisco to present their request to proceed with the Formation of the Limited Liability Company to manage the Design, Construction, and Operation of DUSEL. The Regents enthusiastically approved the request. This is the first step in the creation of the DUSEL LLC.

Underground Lab Comparison

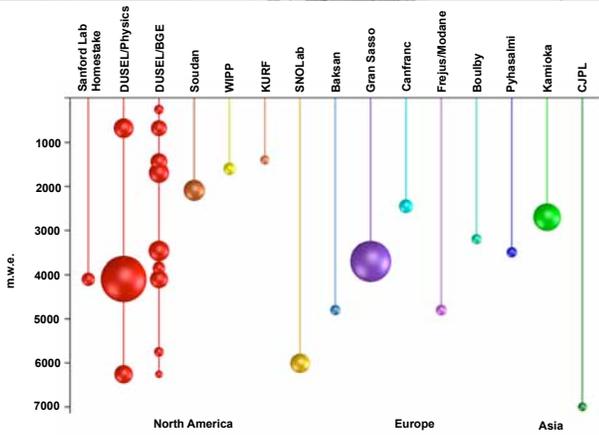


Figure 2: This graphic by DUSEL Project Engineer David Plate compares the volume and depth of DUSEL/Sanford Laboratory (first three columns on left) with other underground labs around the world. Yellow ball at far left represents the Sanford Lab's 4850 Level campus. Red balls in the next column are proposed DUSEL physics labs, and the "DUSEL/BGE" column, third from left, illustrates proposed biology, geology and engineering laboratories.

John F. MacDonald

We are sorry to share the news that John MacDonald passed away in early November. Mr. MacDonald has been involved with DUSEL planning since 2008. He was a member of the Large Cavity Board along with Dr. Evert Hoek, Derek Martin, Edward Cording, and Bob Dengler. Over the past two years, he has provided technical expertise and advice to the DUSEL Project Directorate, National Science Foundation, and others involved in the project regarding issues of siting, excavation stabilization, and monitoring of the large-scale excavations at significant depths at Homestake. He attended a number of DUSEL reviews, visited Berkeley and South Dakota many times, and was always available for consultation when needed.

John F. MacDonald brought many years of experience to the DUSEL project. He received his BS in Civil Engineering at the University of Washington (1973), and prior to that a BS in Physics and Math at Lewis and Clark College, Portland, Oregon (1968). He was past Chairman of the Underground Technology Research Council (UTRC) sponsored both by ASCE (through the Construction

Institute or CI), and SME/AIME. This jointly sponsored Council fosters sharing and exchange of ideas, technologies, and construction methods between the mining and civil engineering professions. The UTRC also maintains liaisons with other entities interested in underground excavation work, including the CI, Underground Construction Association of SME, Rapid Excavation and Tunneling Conference (RETC), ASCE Geo-Institute, American Society of Engineering Geologists (AEG), and the American Rock Mechanics Association (ARMA).

Our sympathies to his wife Janniece and other family members. He will be greatly missed.



John MacDonald inspects core samples in the former Homestake machine shop

DuRA News

DuRA Membership

In the near future, the DUSEL Research Association Executive Committee (DuREC) will be soliciting members of DUSEL.org by email to see if they wish to become voting members of the DUSEL Research Association (DuRA). Membership in DuRA is open by request and all are welcome. In September 2010, DuRA was formed following a community-wide election to continue the DUSEL Experiment Development Committee (DEDC). The latter was established in January 2008 primarily to assist development of the experimental suite to be housed in DUSEL and to liaise between this community and the facility. In addition to assuming the representative functions of the DEDC, the DuREC advocates for the broader interests of the subsurface research community as priorities established by DEDC come to fruition.

Given the research-specific focus of DuRA, emails regarding DuRA business may not be of interest to all and this underlies the upcoming membership request from DuRA. The request will come in the form of a brief survey and responding to the survey will automatically establish membership.

NRC DUSEL Scientific Assessment Committee

A meeting of the NRC DUSEL Committee is scheduled for December 14-15 in Washington, DC to hear scientific presentations from DUSEL and the PAC. The review committee has been commissioned by NSF and will undertake an independent assessment of the proposed DUSEL program, including:

- Major physics questions that could be addressed with the proposed DUSEL and associated physics experiments
- The impact of the DUSEL infrastructure on research in fields other than physics
- The impact of the proposed program on the stewardship of the research communities involved
- The need to develop such a program in the U.S. within the context of similar science programs in other regions of the world
- Broader impacts of such an activity, including but not limited to education and outreach to the public

The DuREC is working with the DUSEL team to coordinate input for this first meeting of the review committee.

National Academy Decadal Study

The BGE membership of DuRA, together with the facility, are assembling a high-level document identifying proposed science experiments in biology, geosciences and engineering to be conducted at DUSEL. This document will provide input to the National Academy's Geosciences Decadal Study and will impact Geosciences investments in the coming decade. This study will outline the scope of inquiry at DUSEL, proposed BGE experiments, coordination and integration of a multi-user facility, and anticipated transformational results from DUSEL in the coming decade.



DUSEL IN THE NEWS

Maptek expertise helps in the rescue of the miners in Chile (October 14)

Note: Maptek is DUSEL's laser scanning contractor. The 3D Vulcan modeling is the technology being used at DUSEL.

On 11 August, 2010, Maptek received a call from the team that was working on the rescue in San José mine, asking for help on the drilling control and 3D display to map the drillholes.

[Maptek] immediately sent one of [their] Mine Engineers, Alvaro Quezada, to the site to help. Following this, Estibaliz Echabarría from the Maptek I-Site team traveled to the site to conduct surveys of the region.

This data were taken into Maptek Vulcan 3D software to create an accurate topographic model and 3D representation of the complex underground workings to understand where the 33 miners were trapped.

To read more: <http://www.maptek.com/news/maptek-expertise-helps-in-the-rescue-of-the-miners-in-chile/>

More DUSEL stories:

Smithsonian.com: *Looking for Neutrinos, Nature's Ghost Particles* (Ann Finkbeiner)

C&EN (Chemical and Engineering News, October 4, 2010: *Lab in a Mine* (Jyllian Kemsley)

Black Hills Pioneer: *Pump up the bandwidth/Lead-Deadwood school district looks at running fiber optic line to lab* (Jaci Conrad Pearson)

Duselwatch.com: *LUX assembly nearly complete; Sanford Lab uses Internet 2 to broadcast science across the country* (Wendy Pitlick)

Science Magazine AAAS: *Scientific Gold Mine?* (Adrian Cho)

www.sanfordlab.org/ - Check out "Twitter updates" in lower left hand column

SANFORD UNDERGROUND LABORATORY AT HOMESTAKE

Governor Rounds visits Sanford Lab

On November 5, South Dakota Governor Mike Rounds spoke at the Second Annual Sanford lab Chili Cook-off. More than 100 staff, contractors, and scientists attended and 21 chili entries were available for tasting and judging. Governor Rounds is responsible for the complex package of measures that allowed the State of South Dakota to reopen Homestake for science purposes. This includes legislation creating the SDSTA and authorizing nearly \$40 million in appropriations, the donation of \$70 million by T. Denny Sanford, and the negotiated agreement with Homestake Mining Co. that gave South Dakota title to the former gold mine.

Rounds also toured the 4850 Level, visiting the MAJORANA Demonstrator's clean room and the Davis Campus near the Yates Shaft. The event also marks the first of a new series of quarterly all-hands meetings to provide updates on the progress of the DUSEL project.

Chili Cook-off results



People's Choice award: First place to Mandy Knight for Chilacious Buffalo Chili. Second place to Pat Kinghorn for White Chili (Cook-off photos: Matt Kapust)



Governor's Choice: First place to Bill (or his wife Eileen) Roggenthen for Holy Terror Chili. Second place to Mandy Knight

First Germanium Detectors Underground



On November 9, Sanford Laboratory technicians helped scientists move 19 cylindrical germanium crystal detectors to the 4850 Level for eventual use by the MAJORANA DEMONSTRATOR experiment. Los Alamos National Laboratory researchers Vic Gehman and Ben Laroque delivered the detectors to Sanford Lab. Sanford Lab Science Liaison Director Jaret Heise briefed the Sanford Lab crew on the fragility and value of the germanium crystals. Special equipment was not needed for the move, but great care was exercised by the sizable crew, which included a forklift operator, a hoist operator at the Ross Hoist, a technical support lead, and seven infrastructure and facilities techs.



Figure 3: In the Transition Cavern, from left: DUSEL Principal Investigator Kevin Lesko, Governor Mike Rounds, Construction Manager Will McElroy, Infrastructure technicians Luke Scott, Alvin Burns, Neil Engle, Todd Stewart, and Rodger Hudson



Figure 4: Governor Rounds accepts a plaque containing a piece of the Davis neutrino detector, presented by Sanford Lab and DUSEL staff



Figure 5: Vic Gehman and Ben Laroque with crated germanium crystals at the 4850 Level (Above, corner: Five germanium detectors)

EDUCATION AND OUTREACH

Planning for the SCSE

The Sanford Center for Science Education (SCSE) planning team continues to work with science education consultants David Heil and Associates (DHA) to engage potential audiences for the SCSE. In October, a survey of K-12 educators was distributed across the state--with the help of the Department of Education--and in neighboring states. The surveys have been returned and are under analysis. On November 16, a focus group met in Sioux Falls with higher education leaders from eastern South Dakota institutions, followed by another meeting in Spearfish on November 18. Representatives of public, private and tribal colleges and universities took part in discussions about the role of the SCSE within the higher education enterprise in South Dakota and potential collaborative efforts.

On November 17, the planning team and DHA met in Pierre with representatives of South Dakota Departments of Tourism and Education, the Board of Regents and DUSEL's Education Governing Board to present preliminary results from the general public/tourist surveys taken around the Black Hills in August and September, as well as preliminary results from the educator survey.

Ben Sayler, Peggy Norris and Bill Roggenthen attended a workshop on Arts and Science at City University of New York in October, at the invitation of the organizers. Representatives of the education efforts at two LIGO sites were also present. The workshop explored the communication of science through theater, film, music and dance, as well as science cafes and festivals--all vehicles to bring

science to audiences that might not consider traveling to a science museum.

Peggy Norris attended the Internet2 Conference on November 1-2 to meet with the K-20 education group, as a follow-up activity to the larger DUSEL presentation that was made at their Spring meeting. As part of Peggy's talk, a high definition, Internet2 video connection was made to the LUX surface laboratory and graduate student Carlos Hernandez Faham from Brown University gave a video tour of the detector assembly area. The high definition video equipment is now on long-term loan from LifeSize, Inc. for education efforts at Sanford Laboratory. Many thanks to DUSEL's Warren Matthews for setting up the arrangements with LifeSize.



Figure 6: Carlos Hernandez of Brown University (right) prepares to speak to Internet2 members in Atlanta

Education and Outreach Activities

The Education and Outreach team has moved into a new workspace at the former Yates Dry, now known as the Yates Education Building. Facilities include offices for the Education and Communication Departments, a small classroom, and a large multipurpose space for groups and meetings. Please visit the next time you are in Lead.

K-12 Education: Connie Giroux gave presentations to Eighth graders from across Rapid City at their citywide career fair.

General Public: Peggy Norris gave a talk at the Journey Museum in Rapid City on the origin of the elements, as part of their monthly science night.

Upcoming opportunities

Several state and regional educator and student organizations (e.g., American Indians in Science and Engineering Education) are planning to meet in Rapid City in the spring and are interested in

DUSEL-related talks, workshops or sessions. In addition, there are ongoing requests for talks by area school groups. If you plan to be visiting Sanford Lab in the spring, consider taking an extra half a day to interact with a school group, educators or the public. Contact Peggy Norris (pnorris@sanfordlab.org) if you are interested in participating in an outreach event.

ENVIRONMENT, HEALTH & SAFETY

LUX cleans confined space

On November 1, LUX researcher Matthew Szydagis of UC Davis used a power washer and common household cleaners to clean the LUX confined space. The centerpiece of the LUX surface lab is a cylindrical water tank 3 meters in diameter and 6 meters high into which the LUX detector will be lowered for testing. Before the surface tank could be filled with water, it had to be cleaned. The LUX water tank is in a three-story detector pit at the surface lab.

Issues of concern for Szydagis, Science Liaison Supervisor Connie Giroux, Safety Manager Chuck Lichtenwalner and three Emergency Response team members were ventilation, access to self-contained breathing apparatus, and emergency egress procedures along with other precautions. They worked together to develop a step-by-step plan including Job Hazard Analysis.



Figure 7 (left): Connie Giroux briefs the LUX tank-cleaning team



Figure 8 (right): Emergency Response Team members Fred Raubach and Woody Hover secure Szydagis with rescue tripod

Water Safety at Sanford Lab

As winter weather approaches and the rain and snow season comes to South Dakota, Sanford Lab staff are on alert for safety issues. A hailstorm on

August 3 and five inches of rain on October 9 triggered the Sanford Underground Laboratory's Incident Notification System. In October, Surface Operations Foreman Dan Regan made a weekend call with crews to assess the damage. Industrial Electrician Marty Brosnahan, along with a crew of infrastructure and facilities techs, host operators and electricians responded. Others were consulted by phone. Underground operations were briefly suspended as infrastructure techs conducted inspections and measurements of water flow on the underground and surface. During the week of November 15, the Lead area received several inches of snow.



Thanksgiving Safety

- Thaw your turkey in the refrigerator. Refrigerate food soon after serving.
- Set your cooking timers and keep an eye on the stove.
- Don't feed your pets turkey with bones, stuffing, or desserts. Give them their own feast.
- Have a Happy Thanksgiving!



For info on Lead, South Dakota road and weather conditions: Call (605) 722-0002

Safety pages on Sanford Lab website: www.sanfordlab.org - Use the left hand menu to open individual pages

NEW STAFF

We would like to welcome **Jim Tarpinian**, the new Environment, Health and Safety Director to DUSEL. Dr. Kevin Lesko announced the appointment on November 15. Lesko pointed out Jim's wealth of experience and knowledge on building environmental, health and safety programs and running effective EH&S teams. Lesko also thanked William "Griff" Griffing for his leadership and guidance during the interim period, as well as Randy McConnell who stepped in during the transition.



Jim Tarpinian is a highly experienced environmental, safety and health (ES&H) professional skilled in developing, administering and improving ES&H programs for world-class government and commercial contractors. His background includes heavy manufacturing, construction, decontamination and decommissioning of nuclear facilities, environmental restoration of hazardous waste sites, and operating national laboratories. Jim's educational background is in biology and radiation safety and he is certified by the American Board of Health Physics. He also holds a certificate in Executive Safety Management from the American Society of Safety Engineers (ASSE) and is a professional member of the ASSE.

Jim and his wife Elaine are relocating to Lead from Columbus, Ohio. They previously lived in such diverse communities as central Pennsylvania, East Tennessee, eastern Washington and Long Island, NY. They enthusiastically state that the Midwest is their favorite part of the country and are very excited to be coming to live in such a beautiful place. Jim and Elaine love the outdoors and are committed to preserve natural places for the benefit of future generations.

"This is a once-in-a-career opportunity for me to be part of a team that will stand up as a new national laboratory," Jim said. "This unique challenge will draw upon all of my professional experience and skills. I feel very privileged to be asked to join this team. The history of the Sanford Underground Lab and the Homestake mine is fascinating. I believe that the DUSEL will open up wonderful educational and technological opportunities for South Dakota. I want to be a part of that."

Jim's favorite quote: *Always do right. This will gratify some people and astonish the rest.* - Mark Twain



Steve Meador at the 4850 Level

Best wishes to Stephen Meador

Stephen Meador, Chief Facilities Officer in Physics at NSF, will be making a career move. November 19 was Steve's last official day at NSF, at which time he will transition to rejoin the DOE. Steve has been a strong supporter of DUSEL and has helped us in advancing our cause in many ways over the past few years. He has been a strict but extremely fair critic of our efforts. His insight, advice and assistance have been immeasurably helpful to the Project, and his quiet, professional approach has always been a pleasure to deal with. Kevin Lesko stated in an e-mail to DUSEL and pertinent NSF and DOE staff, "In my experience with projects of various sizes, working for both the DOE and NSF, I would be hard pressed to find another example of such a strong and productive working relationship as DUSEL has enjoyed over the past two or so years." Lesko also thanked Steve for all he has done and wished him well in his future endeavors.

UPCOMING EVENTS AND ANNOUNCEMENTS

Workshop: New Horizons for International Investigations into Carbon Cycling in the Deep Biosphere, at Univ. of Free State, Bloemfontein, South Africa on January 17-24, 2011. This workshop will bring together scientists worldwide to explore new approaches for retrieving chemical, isotopic, metagenomic, transcriptomic, metabolomic and proteomic information from the deep biosphere where cell concentrations are low and metabolic rates slow. The Network of Inner Space Observatories (NISO), an international research network dedicated to the development of underground laboratories, deep boreholes and mines for microbial studies will also be inaugurated. Travel grants will be available for invited speakers and participating graduate students. For more info please contact: T.C. Onstott (tullis@princeton.edu), Esta vanHeerden (vheerde@ufs.ac.za), Tom Kieft (tkieft@nmt.edu) or B. Sherwood Lollar (bslollar@chem.utoronto.ca).

Upcoming DuRA Events

Presentations that may be of interest to DuRA members are scheduled in the following meetings. Some highlights will be presented by speakers in future monthly reports:

DUSEL Sessions and BGE Meeting at AGU

On Sunday afternoon, December 12, there will be a meeting of the DUSEL BGE community at the Nikko Hotel in San Francisco. This date precedes the DUSEL session at the Fall American Geophysical Union (AGU) meeting. The objectives of the Sunday meeting will be to:

1. Hear from the facility about the status of the PDR
2. Hear from the experiments about the status of their planning efforts
3. Identify areas of synergy and potential collaboration between the experiments, and map out plans for integration

Some in the DUSEL science community believe that we should move beyond informal discussions and take a serious look at collaboration and integration issues. Developing strong synergies between experiments will improve the science and reduce the costs, ultimately leading to stronger proposals.

Agenda

1:30-2:00 Status of the PDR and facility, including plans for 7400L, plans for submission of PDR, etc. (Roggenthen and Salve)

2:00-4:00 Status of experiments. (Transparent Earth, GEOMM, Coupled Processes, Fracture Processes, CO₂, Large Cavity, Deep EcoHydro, Large Pillar, others). We are hoping that each experimental group will send at least one representative to provide a 15-20 minute update on recent activities, and identify areas where interaction between groups could provide meaningful synergy.

4:00-4:20 Break

4:20-5:30 Discussion about collaborations between experiments, co-location of facilities, plans on how to move forward, federal agency partners,

international collaborations, etc. This could be an open session or breakouts.

We encourage other investigators or collaborations to attend this event and present the status of their efforts. Please send RSVPs for this event or queries and information concerning related activities to Larry Murdoch, LMURDOC@clemsun.edu.

Please note also that DUSEL talks and posters will be presented at AGU on Monday, December 13. The talks will take place at 8:00 – 10:00 am, Session H11M, in Moscone West 3020. The posters will be presented at 1:40 – 6:00 pm, Session H13F, Moscone South Poster Hall.

Other DuRA events

Saclay, France Workshop, "Le neutrino dans tous ses états" on November 19. This one-day workshop is dedicated to the memory of neutrino physicist Jacques Bouchez and will be held at the Claude Bloch auditorium, located in l'Orme des Merisiers. http://supernovae.in2p3.fr/~jacdz/JBz/index_eng.php

Standard Model Benchmarks at the Tevatron and the LHC Workshop, November 19-20, 2010. Fermilab, Batavia, IL. <http://www.physics.purdue.edu/particle/cteq/>

2010 AGU Fall Meeting, December 13-17, 2010, San Francisco - Sessions H52, NH13 <http://www.agu.org/meetings/fm10/>

2011 SME Annual Meeting & Exhibit, February 27 – March 2, 2011, Denver. For more info: <http://www.smenet.org/public/Core/Events/eventdetails.aspx?iKey=AME2011&TemplateType=A>

Please send information regarding upcoming meetings of interest or presentations from DuRA members, as well as other related events to Steve Elliott (elliotts@lanl.gov).

HOMESTAKE DUSEL AND SANFORD LABORATORY NEWSLETTER



JOBS

Assistant, Associate or Professor position at SDSMT, Dept. of Physics. Anticipated tenure track faculty position in experimental nuclear/particle physics, research areas related to neutrino physics, proton decay and related experiments requiring deep underground shielding and low background counting. Review: 1/14/2011. Start date: 8/2011. Apply : <http://sdmines.sdsmt.edu/sdsmt/employment>

Non-tenure track Research Faculty Position in Dept. of Physics, Univ. of South Dakota. Candidate will participate in 2010 DUSEL Research Center (CUBED) activities and conduct research at DUSEL. Apply at: <https://yourfuture.sdbor.edu> or submit materials to Chair of Physics Search Committee, Dept. of Earth Sciences and Physics, University of South Dakota, 414 East Clark, Vermillion, SD 57069 or to physics@usd.edu.

Two Faculty Positions, UC Berkeley Physics Dept. in Experimental Particle and/or Nuclear Physics and Theoretical Condensed Matter and/or Materials Physics. Start date: 7/2011. For more info: <http://www.physics.berkeley.edu>. Click on "Faculty Job Listing" links in the right side bar.

Particle Physicist position, Lawrence Berkeley National Lab, Job No. 24879. Work half-time with Particle Data Group and half-time in particle physics or cosmology research. Application deadline 12/1/2010. For more info: <http://www.lbl.gov/LBL-Programs/physics/>

Conventional Facilities Engineer IV, Lead, South Dakota. Apply at Particle Physics Division, Fermilab. Job Code: 100137. LBNE seeks engineer to oversee all aspects of LBNE-specific conventional facilities at DUSEL and nearby properties. For more info: https://Fermi.hodesiq.com/job_detail.asp?JOBID=209176&user+id=

Assistant Professor faculty position at University of Wisconsin-Madison in experimental neutrino physics. Start date: 8/2011. Submission deadline 12/31/2010: <http://www.physics.wisc.edu/apply/fac-search-2010/>

Postdoctoral Position in Particle Detector Development, Dept. of Physics, UC Santa Barbara. Lead detector R&D program, building ultra-high-resolution particle detectors for future neutrino and dark matter detectors. Assist KATRIN neutrino experiment and at UCSB Nanofabrication Facility. Contact: bmonreal@physics.ucsb.edu, Professor Ben Monreal or <http://www.nanotech.ucsb.edu/>

Postdoctoral Position in Direct Dark Matter Detection at Syracuse University, experimental particle astrophysics group working with Cryogenic Dark Matter Search (SuperCDMS), AARM, and DEAP/CLEAN. Further info: <http://cdms.syr.edu/> Apply: <http://www.sujobopps.com>(Job # 026971)

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