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December 19, 2005

David Snyder
Executive Director
South Dakota Science and Technology Authority
and
Kevin T. Lesko
Principal Investigator for the Homestake DUSEL Proposal
South Dakota Science and Technology Authority
P.O. Box 8329, Rapid City, SD 57709

Dear Mr. Snyder and Dr. Lesko,

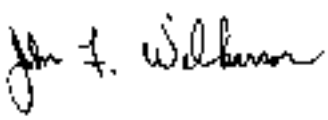
I am writing this letter on behalf of the Majorana Collaboration to express our collaboration's potential interest in the deep underground laboratory space that the South Dakota Science and Technology Authority plans to develop at the Homestake Mine. The objective of the first experimental phase of the Majorana Collaboration is to build a 120-180 kg detector of 86% enriched ^{76}Ge to search for neutrinoless double-beta decay.

Our responses to your 6 questions are on the accompanying pages.

Please let me apologize that our initial response letter is late, this was entirely an error on my part having incorrectly confused the initial response letter due date with the January 27 letter of interest due date.

We very much look forward to exploring in detail with you and the SDSTA the potential opportunity to site our Majorana experiment at Homestake.

Sincerely,



John F. Wilkerson
Professor of Physics
Majorana Collaboration Spokesman

1) Title of proposal:

The Majorana Neutrinoless Double Beta-Decay Experiment

2) List of participants:

The Majorana Collaboration consists of 16 participating institutions and about 100 scientists, postdoctoral fellows, and graduate students.

Brown University, Providence, Rhode Island
Michael Attisha, Rick Gaitskell, John-Paul Thompson

Institute for Theoretical and Experimental Physics, Moscow, Russia
Alexander Barabash, Sergey Konovalov, Igor Vanushin, Vladimir Yumatov

Joint Institute for Nuclear Research, Dubna, Russia
Viktor Brudanin, Slava Egorov, K. Gusey, S. Katulina, Oleg Kochetov, M. Shirchenko, Yu. Shitov, V. Timkin, T. Vvlov, E. Yakushev, Yu. Yurkowski

Lawrence Berkeley National Laboratory, Berkeley, California
Yuen-Dat Chan, Mario Cromaz, Martina Descovich, Paul Fallon, Brian Fujikawa, Bill Goward, Reyco Henning, Donna Hurley, Kevin Lesko, Paul Luke, Augusto O. Macchiavelli, Akbar Mokhtarani, Alan Poon, Gersende Prior, Al Smith, Craig Tull

Lawrence Livermore National Laboratory, Livermore, California
Dave Campbell, Kai Vetter

Los Alamos National Laboratory, Los Alamos, New Mexico
Mark Boulay, Steven Elliott, Gerry Garvey, Victor M. Gehman, Andrew Green, Andrew Hime, Bill Louis, Gordon McGregor, Dongming Mei, Geoffrey Mills, Larry Rodriguez, Richard Schirato, Richard Van de Water, Hywel White, Jan Wouters

Oak Ridge National Laboratory, Oak Ridge, Tennessee
Cyrus Baktash, Jim Beene, Fred Bertrand, Thomas V. Cianciolo, David Radford, Krzysztof Rykaczewski

Osaka University, Osaka, Japan
Hiroyasu Ejiri, Ryuta Hazama, Masaharu Nomachi

Pacific Northwest National Laboratory, Richland, Washington
Craig Aalseth, Dale Anderson, Richard Arthur, Ronald Brodzinski, Glen Dunham, James Ely, Tom Farmer, Eric Hoppe, David Jordan, Richard T. Kouzes, Harry Miley, John Orrell, Jim Reeves, Robert Runkle, Bob Schenter, Ray Warner, Glen Warren

Queen's University, Kingston, Ontario
Marie Di Marco, Aksel Hallin, Art McDonald

Triangle Universities Nuclear Laboratory, Durham, North Carolina and Physics Departments at Duke University and North Carolina State University
Henning Back, James Esterline, Jeremy Kephart, Mary Kidd, Werner Tornow, Albert Young

University of Chicago, Chicago, Illinois
Juan Collar

University of South Carolina, Columbia, South Carolina
Frank Avignone, Richard Creswick, Horatio A. Farach, Todd Hossbach, George King

University of Tennessee, Knoxville, Tennessee
William Bugg, Yuri Efremenko

University of Washington, Seattle, Washington
John Amsbaugh, Tom Burritt, Jason Detwiler, Peter J. Doe, Joe Formaggio, Mark Howe, Rob Johnson, Kareem Kazkaz, Michael Marino, Sean McGee, Dejan Nilic, R. G. Hamish Robertson, Alexis Schubert, John F. Wilkerson

3) A brief description of the proposed program.

The Majorana collaboration is proposing to build a 120 -180 kg detector of 86% enriched ^{76}Ge to search for neutrinoless double-beta ($0\nu\beta\beta$) decay. Such an array should reach an ultimate effective Majorana-neutrino mass sensitivity of ~100 meV, which is about five times better than current results and covers the "quasi-degenerate" mass solution region. Our approach is scalable, thus any future desired increases in detector mass to probe smaller neutrino masses can be effectively implemented.

The Majorana experiment is described in the recent report issued by the Neutrino Scientific Assessment Group (NuSAG) Committee:
http://www.science.doe.gov/hep/NuSAGReport1final.pdf .
One can also find additional detailed documents on our web page at:
http://ewiserver.npl.washington.edu/majorana/NuSAG/documents.html

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

Majorana has a variety of room requirements that are defined in the attached draft infrastructure and space documents (majorana_site_infrastructure_rev_01 and majorana_site_facilities_rev_01). The specific room layouts will likely be adjusted to take advantage of the unique characteristics of the particular site where Majorana is eventually located.

5) An estimate of when we will require access to the underground facility.

It is anticipated that access to low background counting facilities would be beneficial as soon as they are made available. In addition the ability to "grow" ultra-pure copper even in a shallow, but underground site would be very beneficial as early as 2007. We intend to submit our proposal to the Department of Energy in late winter or early spring 2006. If successfully reviewed and accepted, we anticipate major proposal funding in 2008 and would commence building underground detector components in 2008 and 2009.

6) Any other general requirements or questions for the experiment, research, or outreach activities.
We anticipate needing access to low background counting facilities, underground chemistry labs for Cu purification, and detector and material storage. In addition access to surface machine shops would be helpful. Having access to clean underground assembly areas, even at shallow depths (300 mwe) would be very helpful. A deep (>6000 m.w.e.) depth would be desirable, in particular for a large 1000 kg scale experiment.