

## Postdoctoral Research Fellow – Superconducting Sensors for BSM Physics (Facility for Rare Isotope Beams at Michigan State University)

<b>START DATE:</b>	11/1/2023
<b>DEPARTMENT:</b>	Physics
<b>LOCATION:</b>	East Lansing, MI USA (FRIB at MSU)
<b>SALARY:</b>	\$70,000 USD
<b>APPLICATION DEADLINE:</b>	September 15 2023

For more information on the application process, please contact [Prof. Kyle Leach](mailto:kleach@mines.edu) ([kleach@mines.edu](mailto:kleach@mines.edu))

### JOB SUMMARY/ADVERTISING TEXT

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The [Electroweak Interactions Group](#) at the [Colorado School of Mines](#) is recruiting a post-doctoral researcher to perform the first work on the new SALER (superconducting array for low-energy radiation) experiment at the [Facility for Rare Isotope Beams \(FRIB\)](#) at Michigan State University. SALER will be the first ever experiment to use superconducting sensors *on-line* at a rare isotope beam facility. **We seek a candidate with significant experience in low-temperature physics using cryogenic sensing techniques. The candidate should have an interest in applying these methods to search for physics Beyond the Standard Model (BSM) via precision measurements of nuclear decay.** The successful candidate will be integrated into both the [BeEST](#) and [SALER](#) experiments and will be expected to lead the SALER technical development at FRIB and participate in data analysis. **The primary responsibility of the researcher will be to set up and commission the new SALER experiment in the ReA3 hall at FRIB at Michigan State University.** This will involve beamline integration of the adiabatic demagnetization refrigerator (ADR) (in collaboration with local technical staff), mounting and repair of superconducting sensors and wiring, and performing off-line measurements using stable ion beam, pulsed lasers, and a low-energy X-ray generator. The researcher will be stationed full-time at FRIB in East Lansing, Michigan, USA, and will manage the local experimental and laboratory facilities related to the superconducting sensing programs. Occasional travel to Colorado and Lawrence Livermore National Laboratory (California) may be required. The candidate must be able to work well in diverse, mid-sized international collaborations, and will be responsible for documenting and disseminating their research work according to guidelines of the collaborations.

The initial appointment will be for two years, with the possible extension of a third. Salary and benefits are highly competitive and will be commensurate with experience and fit of the candidate. The successful candidate will report directly to [Prof. Kyle Leach](#), head of the Electroweak Interactions Group and PI of the SALER project at FRIB.

### PRIMARY RESPONSIBILITIES

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- Lead the setup of the SALER experiment at FRIB and beamline integration with the ADR
- Lead the development and integration of the DAQ system for low-energy measurements
- Off-line commissioning and characterization of the SALER experiment at FRIB including data acquisition and analysis
- Mentor and lead a team of student researchers related to the superconducting sensing program

- Interact with university, industry, and laboratory collaboration partners on various aspects of the technical and scientific components of the experiments

#### ADDITIONAL RESPONSIBILITIES

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- Participate in the BeEST experiment, possibly in a leading role that is synergistic with SALER
- Publish research results in peer-reviewed, high-level scientific or technical journals
- Present results at national and international conferences, seminars, and workshops

#### MINIMUM QUALIFICATIONS

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##### **Education and Experience:**

- Ph.D. in cryogenic sensing, low-temperature physics, or related field
- Experience mentoring young researchers in a diverse, supportive environment

##### **Knowledge, Skills, and Abilities:**

- Expertise in cryogenic environments such as dilution refrigerators and/or ADRs
- Programming skills relevant to control, operation, and analysis (e.g. C++, ROOT, python)
- Strong oral and written communication skills
- Ability to travel nationally and internationally

#### PREFERRED QUALIFICATIONS

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##### **Education and Experience:**

- Previous experience with superconducting devices such as STJs, TES', or MMCs
- Experience with data acquisition and analysis of subatomic physics experimental data
- Previous experience with lasers and fiber integration would be an asset
- Previous experience with X-ray generators would be an asset

##### **Knowledge, Skills, and Abilities:**

- Ability to develop low-noise environments for precision measurements with STJs
- Ability to wirebond small superconducting sensors

#### ABOUT COLORADO SCHOOL OF MINES AND THE DEPARTMENT OF PHYSICS

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The Colorado School of Mines is an engineering-focused R1 research university and is consistently [ranked](#) among the top engineering and technical colleges in the United States. The [Department of Physics](#) is located in the new CoorsTek Center for Applied Science and Engineering and offers an active, vibrant environment for all students and researchers with state-of-the-art laboratory space and infrastructure. Our unique combination of Nuclear Engineering and Quantum Engineering programs located on campus allows for cross-cutting research in subatomic physics with quantum sensors. Our Department and Research Groups have access to all [shared facilities](#) within these interdisciplinary programs, including large centers with state-of-the-art facilities required to perform materials characterization work of our sensors.



## ABOUT THE FACILITY FOR RARE ISOTOPE BEAMS (FRIB) AND MICHIGAN STATE UNIVERSITY

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The Facility for Rare Isotope Beams (FRIB) is a U.S. Department of Energy Office of Science (DOE-SC) user facility located on the campus of Michigan State University (MSU). Hosting the most powerful heavy-ion accelerator in the world, FRIB supports research in the physics of atomic nuclei, nuclear astrophysics, fundamental interactions, and applications of rare isotopes to benefit society.

MSU, an R1 research university, is located on one of the largest university campuses in the U.S. MSU has 17 degree-granting colleges and is a center for academic and research activities as well as the arts and athletics. Since 2010, MSU's nuclear physics graduate program has been the top-ranked in the nation, according to U.S. News and World Reports.

The greater Lansing area has a population of more than 460,000 and offers lovely suburban areas, urban living opportunities as well as easy-to-get-to rural areas. A symphony orchestra, excellent health care, many community and professional theatres, rivers, lakes, outdoor festivals, close access to large cities and Lake Michigan make for a near-perfect living environment

## MINES EEO STATEMENT

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Colorado School of Mines is committed to equal opportunity for all persons. Mines does not discriminate on the basis of age, sex, gender (including gender identity and gender expression), ancestry, creed, marital status, race, ethnicity, religion, national origin, disability, sexual orientation, genetic information, veteran status or current military service. Further, Mines does not retaliate against community members for filing complaints regarding or implicating any of these protected statuses.

Mines' commitment to nondiscrimination, affirmative action, equal opportunity, and equal access is reflected in the administration of its policies, procedures, programs and activities and in its efforts to achieve a diverse student body and workforce. Through its policies, procedures and resources, Mines complies with federal law, Colorado state law, administrative regulations, executive orders and other legal requirements to prevent discrimination (including harassment or retaliation) within the Mines campus community and to address potential allegations of inequity or concerns for safety.

## TOTAL BENEFITS

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Mines is proud to provide exceptional benefits that include pay, health & wellness and work/life balance offerings. Our portfolio of benefits includes medical, dental, vision, disability insurance, flexible spending accounts, life insurance, and retirement savings plans. Additionally, Mines employees are eligible for tuition benefits (for employees and dependents), generous paid holidays and leaves and discount programs. Additionally, Mines' leadership and innovation brings proximity and access to several research centers, consortia, agencies, labs and bleeding edge technology. For more information, visit [Mines benefits](#).