

# Job Description

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# **Part I Accelerate technology and Physics**

## **No.1. Researcher - Linac RF Power Sources**

### **Overview**

The primary objective of this role is to contribute to the advancement of the 648 MHz klystron power source development. This involves primarily focusing on the development of a long-pulse solid-state modulator, the design of a high-current H-bridge module, and the principal design, electrical simulation, and debugging of an ultra micro-crystalline high-frequency transformer. Additionally, responsibilities include overseeing the design and development of the feedback control system and overcurrent fast protection system for the long-pulse solid-state modulator. Furthermore, the incumbent will be accountable for the collaborative commissioning of the entire modulator and klystron system to meet specified requirements.

### **Major Duties/Responsibilities:**

1. Undertake the operation and maintenance of CSNS Linac RF system;
2. Undertake the research and development of China Spallation Neutron Source II (CSNS-II) 648 MHz klystron high-voltage solid-state modulator;
3. Participate in the overall design of CSNS-II Linac RF power source;
4. Participate in the commissioning and operation of CSNS-II Linac RF power sources;
5. Participate in the pre-research work of CSL.

### **Basic Qualifications:**

- PhD, or about to receive a PhD, in Electronic Science and Technology or Microwave Engineering or related field;
- Background in power electronics, electromagnetic fields and waves, or high voltage and insulation technology;
- Skillfully use circuit simulation software such as Altium, Matlab or PSPICE;
- Experience in high voltage power supply and modulator design is preferred;
- Experience in FPGA, PLC and other programmable logic devices is preferred;
- Good English communication and writing skills.

## **No.2. Researcher - Medical Isotope Production Based on Proton**

### **Beam**

#### **Overview**

Medical isotope production and application will be one important research direction at the CSNS. CSNS-II proton accelerator will provide a high-power beam with an energy of 300 MeV and a power of 100 kW. Based on the beam condition, the alpha-emitting medical isotopes are especially advantageously produced at CSNS. the high-power producing target will be studied. The medical isotope facility and its layout will be designed. And the advanced radiochemical experimental laboratory will be presented. Furthermore, the production cross-sections for targeted isotopes will be measured and analyzed. Concurrently, efforts will be focused on the development of target materials and target fabrication technology.

#### **Major Duties/Responsibilities:**

1. Undertake research and analysis on the generation of accelerator target isotopes;
2. Participate in the planning and construction of accelerator isotope production facilities;
3. Undertake experiments on accelerator isotope production and separation;
4. Participate in research on accompanying proton beam irradiation experiments;
5. Development of target fabrication techniques;
6. Maintenance and operation of the CSNS proton beam experimental platform.

#### **Basic Qualifications:**

- Post-doctor in nuclear physics or nuclear technique;
- Background on Nuclear Physics and Experimental Nuclear Physics;
- Proficient in FLUKA or Geant4;
- Experience in nuclear reaction based on proton or neutron beams is preferred;
- Good communication ability and writing skills in English.

### **No.3. Researcher - Radio-Frequency Technology Research**

#### **Overview**

The aim of this project is to construct a comprehensive radio-frequency system for the South China Advanced Photon Source (SAPS). This encompasses the radio-frequency accelerating cavity system, low-level control system, and high-power test platform. Additionally, there are opportunities for involvement in the operation of the China Spallation Neutron Source II (CSNS-II).

#### **Major Duties/Responsibilities:**

1. Conduct high quality research in advanced digital low-level control algorithms and systems;
2. Participating in the pre-research work of RF system of the SAPS;
3. Participating in the development of the ring RF system of the CSNS-II;
4. Participating in the operation and maintenance of the ring RF system of the CSNS.

#### **Basic Qualifications:**

- PhD in Physical Science or related field;
- Post-doctoral or research assistant experience;
- Background in radio-frequency and microwave technology;
- Prior experience in particle physic preferred;
- Good interpersonal and communication skills (written and oral English).

## **No.4. Researcher - Accelerator Physics**

### **Overview**

The main goal of this position is to study the accelerator physical design of South China Advanced Photon Source (SAPS) and China Spallation Neutron Source II (CSNS-II). At the same time, this position requires participation in key technical pre-study.

### **Major Duties/Responsibilities:**

1. Undertake the accelerator physical design;
2. Participate in accelerator key technology pre-research.

### **Basic Qualifications:**

- PhD degree in Particle Physics;
- Post-doctoral or special research assistant experience;
- Major in plasma physics, accelerator physics, atomic and molecular physics, or electronic information engineering;
- Experience in accelerator physics design preferred;
- Good English communication and writing skills.

## **No.5. Researcher - Radio-Frequency Technology Research**

### **Overview**

The purpose of this project is to build complete radio-frequency system for the South China Advanced Photon Source (SAPS), which includes radio-frequency accelerating cavity system, low-level control system and high-power test platform. Besides, there are opportunities to participate in the operation of the CSNS II.

### **Major Duties/Responsibilities:**

1. Conduct high quality research in advanced digital low-level control algorithms and systems;
2. Participating in the pre-research work of RF system of SAPS;
3. Participating in the development of the ring RF system of the CSNS II;
4. Participating in the operation and maintenance of the ring RF system of CSNS II;

### **Basic Qualifications:**

- PhD in Physical Science or related field;
- Post-doctoral or research assistant experience;
- Background in radio-frequency and microwave technology;
- Prior experience in particle physic preferred;
- Good interpersonal and communication skills (written and oral English).

## **No.6. Postdoctoral Researcher - Physical Design of the Muon Target**

### **Overview**

The main goal of this position is to develop the muon target (MELODY) for the CSNS-II project. Different target geometries and materials shall be studied taking into consideration the primary proton beam characteristics at 20 kW and the acceptance of the collectors. At the same time, a new target under a larger beam power of 50 kW needs to be designed in order to obtain more intense surface and decay muons beams.

### **Major Duties/Responsibilities:**

1. Engage in research and development (R&D) for the MELODY target system, with a focus on muon beam experiments as the primary option;
2. Investigate long baseline neutrino oscillations as secondary.

### **Basic Qualifications:**

- Doctoral experience;
- Background on experimental particle physics;
- Proficient in FLUKA or/and Geant4;
- Proficient in CERN's Root or gnuplot;
- Knowledge in AI methods like machine learning or/and Neural Networks is an asset.

## **No.7. Postdoctoral Researcher - Medical Isotope Production**

### **Overview**

Based on the CSNS medium-energy proton beam, the different isotopic target will be investigated for producing the aiming medical isotopes, especially, alpha-emitting isotope including Ac-225, Ra-223 et al. The yield with different beam parameters and target will be studied and the measurement experiments will be carried out using the current CSNS proton beam. The producing cross sections for aiming isotopes will be measured. On the other hand, the target material and target fabrication technology will be developed.

### **Major Duties/Responsibilities:**

1. Simulation for the isotope production for different material and target geometry;
2. Experiments will be carried out for aiming medical isotope;
3. Developing the target fabrication technology;
4. Maintain and operation jobs for CSNS proton beam experimental platform.

### **Basic Qualifications:**

- Ph.D. degree;
- Background on nuclear physics and experimental nuclear physics;
- Proficient in FLUKA or/and Geant4;
- Experimental experience in nuclear reaction based on proton or neutron beams is an asset;
- Good communication ability and writing skills in English.

## **No.8. Postdoctoral Researcher - Low Voltage Technology Research**

### **Overview**

The purpose of this project is to develop an advanced low-level control system for utilization in the ring radio-frequency system of the South China Advanced Photon Source (SAPS). There are also opportunities to participate in the operation of the China Spallation Neutron Source II (CSNS-II) and other related scientific projects.

### **Major Duties/Responsibilities:**

1. Conduct low-level systems pre-research for the SAPS;
2. Conduct advanced low-level control technology research;
3. Participate in the operation and maintenance of the CSNS-II;
4. Participate in other scientific research work of the subject group;

### **Basic Qualifications:**

- PhD in physical science or related field;
- Background in radio-frequency and microwave technology;
- Prior experience in superconducting cavity low level control systems preferred;
- Good interpersonal and communication skills (written and oral English).

## **No.9. Postdoctoral Researcher - Power Supply Engineer**

### **Overview**

The objective of this project is to provide the power system for the CSNS accelerator. The CSNS particle accelerator utilizes a 25 Hz fully digitalized resonant power supply to mitigate magnetic field distortions arising from magnet saturation. The primary responsibilities of this position include the maintenance and operation of the power system, as well as the upgrading and optimization of the control software for the power supply system.

### **Major Duties/Responsibilities:**

1. Engage in the maintenance and operation of the CSNS power supply system.
2. Undertake research and development work related to the upgrade, transformation, and localization of the power supply system's digital controllers, including software coding and testing, ultimately achieving the project's expected technical specifications.
3. Participate in the construction of the CSNS-II power supply and pulse power supply system.

### **Basic Qualifications:**

- Education: Ph.D. candidate;
- Majored in Power Electronics and Electric Drive, or Automation Control, or other related fields;
- Proficient in Quartus II software for FPGA-based hardware circuit design, familiar with Verilog-HDL and other relevant programming languages, with some design experience;
- Good interpersonal and communication skills (written and oral English).

## **No.10. Postdoctoral Researcher - Accelerator Physics Research**

### **Overview**

The purpose of this project is to study beam loss mechanisms in a high-intensity proton linac. To achieve this goal, we plan to conduct beam experiments, analyze data, and perform multi-particle simulations. Additionally, throughout the project, we will also have the opportunity to develop new methods and software for estimating beam loss.

### **Major Duties/Responsibilities:**

1. Undertake simulation research on beam losses in the CSNS-II linear accelerator;
2. Participate in beam experiments of the linear accelerator;
3. Participate in beam tuning work for the linear accelerator.

### **Basic Qualifications:**

- Ph.D. degree in Particle Physics;
- Background in Nuclear Technology and Applications or Particle Physics or Nuclear Physics;
- Proficient in using beam dynamics simulation software;
- Prior experience in accelerator physics lattice design preferred;
- Good English communication and writing skills.

## **No.11. Postdoctoral Researcher - Novel ECR H- Source**

### **Overview:**

The task of this position is to address the issue of developing a new type of negative hydrogen ion source and participating in the pre-research of the electron gun and its pre-acceleration system for the Southern Advanced Photon Source (SAPS). We plan to achieve this objective through the method of conducting in-depth research and development of the ion source and electron gun technologies. This will involve designing, testing, and optimizing the performance of these critical components to ensure their reliability and efficiency. Additionally, during the project process, we will also involve collaboration with experts in plasma physics, atomic and molecular physics, and electronic information engineering to leverage their expertise and insights in these areas. This collaborative approach will enable us to integrate diverse perspectives and knowledge to achieve the project's objectives effectively.

### **Major Duties/Responsibilities:**

1. Undertake the development of a new negative hydrogen ion source;
2. Participate in the preliminary research of the electron gun and its pre-acceleration system for the SAPS;
3. Responsible for the assembly, debugging, operation, and maintenance of the front-end system of the CSNS accelerator.

### **Basic Qualifications:**

- Ph.D. degree in Nuclear Physical;
- Background in plasma physics, atomic and molecular physics, or electronic information engineering;
- Prior experience in ion source and linear accelerator design is preferred;
- Good English communication and writing skills.

## **Part II Neutron Scattering Application**

### **No.1. Researcher - Neutron Backscattering Spectrometer**

#### **Overview**

The Neutron Backscattering Spectrometer (NuBS) at CSNS is one of nine spectrometers planned by CSNS-II and is constructing at Dongguan, China now. NuBS will be dedicated to studies of sub-nanosecond nanometer-scale dynamics in materials using neutron backscattering. It has extreme high energy resolution, about  $\mu\text{eV}$ , and suits for both QENS and INS measurement. NuBS is seeking an instrument scientist to working for data processing and user support. The scientist will collaborate with instrument staff, engineering, and control groups to develop a software solution for user-friendly and efficient automated processing of large amounts of TOF neutron scattering data, and the necessary data analysis tools for NuBS. The candidate will support users at NuBS, transforming the instrument capabilities into mature, user-friendly tools, conducting groundbreaking research. The successful candidate will also be expected to establish a science program that leverages NuBS.

#### **Major Duties/Responsibilities:**

1. Conduct high quality research using Neutron Backscattering techniques;
2. Work together with the members of the NuBS for design and construction of NuBS;
3. Work to develop data processing strategy and data analysis tools for NuBS;
4. Participated in the user support at NuBS.

#### **Basic Qualifications:**

- PhD, or about to receive a PhD, in a physical science or related field;
- Major in Physics, Material Science, or related discipline;
- Demonstrated experience in X-ray or neutron scattering;
- Demonstrated experience in scientific programming;
- Ability to work independently as well as effectively in a collaborative team environment for solving scientific problems;
- Prior experience in Inelastic and Quasi-elastic neutron scattering preferred;
- Good interpersonal and communication skills (written and oral English).

## **No.2. Researcher - Data Analysis and Modeling of Inelastic Neutron**

### **Scattering**

#### **Overview**

The main goal of this position is to design and develop inverse geometry molecular vibration spectrometer (iMovies) at CSNS, which is an upcoming time of flight (TOF) indirect-geometry spectrometers for INS. The similar operational instruments include TOSCA @ISIS, UK and VISION @ SNS, USA. In addition, as beamline scientist, the applicant need support the users for their INS experiments, INS data analysis and modeling.

#### **Major Duties/Responsibilities:**

1. Design and develop inverse geometry molecular vibration spectrometer (iMovies) at CSNS;
2. Conduct INS data analysis and modeling;
3. Elastic/inelastic neutron scattering applications on batteries, fuel cell, catalysts, MOF, etc.

#### **Basic Qualifications:**

- PhD, or about to receive a PhD, in physical, chemical or materials science;
- Post-doctoral or special research assistant experience;
- Background in materials and DFT / MD / machine learning;
- Proficient in using software such as CASTEP, VASP, Gaussian, CP2K, Phonopy, Crystal, LAMMPS, ORCA, Matlab, etc.;
- Prior experience in spectral data (Raman, IR and INS) analysis and modeling preferred;
- Good interpersonal and communication skills (written and oral English).

### **No.3. Researcher - Biology Research Platform**

#### **Overview**

The main goal of this position is to ensure a smooth operation of the recently established biology research platform at CSNS and to engage in an active biology research program.

#### **Major Duties/Responsibilities:**

1. Develop new boron medicine for BNCT.
2. Conduct high quality research using neutron scattering and x-ray diffraction techniques.
3. Test, operate and maintain a biology research platform.

#### **Basic Qualifications:**

- PhD in structural biology or related field;
- Postdoctoral experience in crystallography preferred;
- Good interpersonal and communication skills (written and oral English).

## **No.4. Engineer - Target/Moderator and Reflector**

### **Overview**

The target, moderator, and reflector constitute the core systems of the China Spallation Neutron Source (CSNS), encompassing precision machinery, pressure vessels, vacuum systems, cryogenic technology, water cooling, and other specialized components. The development of these systems involves a diverse range of processing and manufacturing techniques, including but not limited to: Precision design of intricate mechanical structures; Finite element analysis and calculation of pressure vessel structures; Vacuum system design calculations; Precise techniques such as TIG welding, electron beam welding, and diffusion welding; Metal thermal spraying; Research into the preparation process technology for metal composite materials; Investigation into metal 3D printing technology, among others.

### **Major Duties/Responsibilities:**

1. Undertake the structural design and mechanical simulation analysis of high-power targets, moderators and reflectors, as well as the design of engineering drawings;
2. Undertake the research and development of key processes such as electron beam welding and diffusion welding, as well as material testing and characterization;
3. Undertake the construction and final test of the moderator low-temperature test system;
4. Participate in the operation and maintenance of key equipment, as well as the research and analysis of operating data;
5. Participate in equipment installation and commissioning.

### **Basic Qualifications:**

- PhD degree;
- Background in mechanical engineering, mechanical design and manufacturing and automation, mechanical and electronic engineering, etc.;
- Proficient in using 3D modeling software (Solidworks, etc.) and finite element simulation software (Ansys, etc.);
- Experience in complex mechanical systems, vacuum equipment, complex structure optimization design, etc. is preferred;
- Good English communication and writing skills;

## **No.5. Researcher - Elastic Diffuse Scattering Neutron Spectrometer**

### **Overview:**

Elastic diffuse scattering neutron spectrometer (EDS) is mainly aimed to characterize the short-range order of atomic displacement, vacancies and spins in single crystal sample. This instrument will consist a suite of single crystal neutron diffraction for studies of material science, condensed matter physics and molecular systems.

### **Major Duties/Responsibilities:**

1. Design, procure, install and commission the EDS spectrometer;
2. Work closely with the lead engineer, forming the core instrument team;
3. Operate and develop the EDS and scientific uses;
4. Collaborate closely with scientist and engineers from different groups and research areas;
5. Develop outstanding science and innovative technologies based on the use of neutron scattering techniques, especially neutron diffraction.

### **Basic Qualifications:**

- PhD degree, preferably in physics, chemistry, materials and life science;
- Experience in neutron or X-ray single-crystal diffraction;
- Background of the data analysis software for diffraction (e.g. Fullprof, GSAS, Jana);
- Experience of neutron instrumentation development;
- Good interpersonal communication and presentation skills, and ability to interact effectively with staff and users at all levels;
- Flexibility to occasional requests to work out-of-hours to support users;
- Experience with user operation at a large-scale neutron facility is preferred;
- Experience with time-of-flight neutron diffraction (powder or single-crystal) is preferred;
- Practical knowledge of other neutron techniques relevant to materials research (e.g. inelastic scattering, SANS, reflectometry);
- Practical knowledge of polarized neutron scattering and extreme sample environment (low-temperature, magnetic field, high-pressure) experiments is preferred;
- Experience of analysis and reduction of single-crystal Time-of-flight neutron diffraction data, as well as crystallographic and magnetic structure refinement is preferred;
- Experience of Monte-Carlo simulation of neutron instruments is preferred;
- Experience of working in an international environment is preferred.

## **No.6. Researcher - Single Crystal Time-of-Flight Neutron**

### **Diffractometer**

#### **Overview:**

Single-crystal time-of-flight neutron diffractometer (SCND) is dedicated to solve crystallographic and magnetic structure of single-crystal samples with the unit cell up to  $\sim 100$  Å. This neutron instruments will consist a suite of single crystal neutron diffraction for studies of material science, condensed matter physics and molecular systems.

#### **Major Duties/Responsibilities:**

1. Design, procure, install and commission the SCND spectrometer;
2. Work closely with the lead engineer, forming the core instrument team;
3. Operate and develop the SCND and scientific uses.
4. Collaborate closely with scientist and engineers from different groups and research areas;
5. Develop outstanding science and innovative technologies based on the use of neutron scattering techniques, especially neutron diffraction;

#### **Basic Qualifications:**

- PhD degree, preferably in physics, chemistry, materials and life science;
- Experience in neutron or X-ray single-crystal diffraction;
- Knowledge of the data analysis software for diffraction (e.g. Fullprof, GSAS, Jana);
- Experience of neutron instrumentation development;
- Good interpersonal communication and presentation skills, and ability to interact effectively with staff and users at all levels;
- Flexibility to occasional requests to work out-of-hours to support users.
- Experience with user operation at a large-scale neutron facility is preferred;
- Experience with time-of-flight neutron diffraction (powder or single-crystal) is preferred;
- Practical knowledge of other neutron techniques relevant to materials research (e.g. inelastic scattering, SANS, reflectometry);
- Practical knowledge of polarized neutron scattering and extreme sample environment (low-temperature, magnetic field, high-pressure) experiments is preferred;
- Experience of analysis and reduction of single-crystal Time-of-flight neutron diffraction data, as well as crystallographic and magnetic structure refinement is preferred;
- Experience of Monte-Carlo simulation of neutron instruments is preferred;
- Experience of working in an international environment is preferred.

## **No.7. Researcher - Software Developer for Scientific Applications**

### **Overview**

The IT department at CSNS is looking for a dedicated software developer to take on a pivotal role in developing and maintaining software and database systems tailored for scientific research. The successful candidate will be instrumental in creating a user service system for the China Spallation Neutron Source (CSNS), developing application software in the field of neutron scattering using AI and Large Language Models (LLMs), and constructing databases focused on material science using experimental and simulation data.

### **Major Duties/Responsibilities:**

1. User Service System Development for CSNS: Design and develop a comprehensive user service system to facilitate research activities at CSNS, enhancing user experience and operational efficiency;
2. AI and LLM-based Application Software Development: Utilize cutting-edge technologies such as Artificial Intelligence and Large Language Models to create innovative application software for neutron scattering research, aiming to automate and optimize data analysis and interpretation processes;
3. Database Construction for Material Science: Build and maintain databases incorporating both experimental and simulation data in the field of material science, ensuring data integrity, accessibility, and usability for research purposes.

### **Basic Qualifications:**

- Ph.D. in Computer Science, Software Engineering, or a related field;
- Proficiency in common programming languages such as Python and Java, with good programming practices and code management skills;
- Good capabilities in system design and architecture, capable of independently leading the development of large projects;
- Familiarity with AI and machine learning algorithms; practical application experience is preferred;
- Experience of scientific data processing and analysis is preferred.

## **No.8. Researcher - Neutron Detector Research**

### **Overview**

The main goal of this position is to study the detector physics and develop advanced thermal neutron detectors for the instruments of China Spallation Neutron Source phase II (CSNS II). The task will include detector physics research, Monte Carlo simulation, prototype development, engineering design and optimization, massive fabrication, installation and the commissioning. In addition to train doctoral students as a supervisor, you will also have the opportunity to collaborate with users and staff to develop new methods for neutron measurements.

### **Major Duties/Responsibilities:**

1. Conduct high quality research on detector physics using MC simulation and beam experiments.;
2. Develop advanced thermal neutron detectors for the instruments;
3. Participate in detector development, massive fabrication, installation, commissioning and maintenance.

### **Basic Qualifications:**

- PhD, or about to receive a PhD, in particle physics and nuclear physics, nuclear technology or related field;
- Background in detector physics or neutron detection;
- Proficient in using software such as Geant4, Garfield, ROOT, ANSYS, etc.;
- Prior experience in thermal neutron detectors preferred;
- Good interpersonal and communication skills (written and oral English).

## **No.9. Researcher - Soft Matter Sample Environment**

### **Overview**

The primary objective of this role is to design sample environment equipment tailored for soft matter studies using neutron scattering techniques. This encompasses the development of in-situ sample environment equipment specifically designed for utilization at CSNS II. In addition to creating streamlined workflows for routine tasks, you will collaborate with users and staff to innovate and refine in-situ sample environment equipment for neutron scattering experiments. This collaborative effort aims to facilitate the effective translation of measurement results into actionable knowledge. Furthermore, it is essential to ensure the stable operation of relevant sample environment equipment and adhere to the directives provided by superiors.

### **Major Duties/Responsibilities:**

1. Operate, maintain, optimize, and upgrade the sample environment equipment for soft matter, such as the rheometer and the temperature jump equipment for small-angle neutron scattering (SANS) and very small-angle neutron scattering (VSANS);
2. Design and maintain sample environment equipment for soft matter in the CSNS Phase II project, such as humidity chambers, gas adsorption tanks, rheometers, etc.;
3. Design and develop in-situ sample environment equipment for soft matter for neutron scattering, such as dynamic light scattering apparatus, UV spectrometers, cryopreservation equipment, etc.;
4. Participate in the assembly, debugging, operation, and maintenance of related sample environments.

### **Basic Qualifications:**

- PhD degree;
- Postdoctoral researcher or assistant researcher experience;
- Background in engineering, biology, and chemistry;
- Programming experience and proficient in using software such as 3D design, ANSYS, etc.;
- Prior experience in soft matter, low temperature/variable temperature sample environment design is preferred;
- Good interpersonal and communication skills (written and oral English), with more than 5 SCI papers as first author/correspondence.

## **No.10. Researcher - Neutron Surface Scattering Technique**

### **Overview**

A dedicated neutron reflectometer with a horizontal sample geometry has been scheduled to specifically focus on the study of structure and formation of thin films (layers) as well as their response to environmental changes. The instrument will be particularly optimized for the areas of soft condensed matter, life science, and advanced materials with free liquid surfaces, liquid-liquid, solid-liquid and solid-air interfaces.

### **Major Duties/Responsibilities:**

1. Undertake the engineering physics design and definition of key parameters for the spectrometer project;
2. Undertake the pre-research and development work of key equipment for the spectrometer;
3. Participate in the anticipated performance simulation work of the spectrometer;
4. Responsible for establishing domestic/international partnership relations and promotional activities for the spectrometer.

### **Basic Qualifications:**

- Ph.D. in physics, materials science, or closely related field. At least two years' postdoctoral research experience is required;
- Experience with neutron and/or synchrotron-based X-ray instruments;
- Experience with neutron or synchrotron-based X-ray instrument design and operation is preferred;
- Experience with neutron reflectometry and GISANS measurements is preferred;
- Experience in computer modelling and programming e.g., with McStas or Python or other high-level languages;
- Good communication skills and networking abilities.

## **No.11. Engineer - Mechanical Designer**

### **Overview**

The primary objective of this role is to lead the design, production, and installation of optical devices. This entails overseeing the development of various components such as slits, secondary shutters, guide systems, and their corresponding housings. As the focal point for the optics device within an entire instrument, you will encounter both significant challenges and opportunities. Your role involves translating conceptual designs into tangible, functional devices, contributing to the advancement of our research endeavors.

### **Major Duties/Responsibilities:**

1. Assuming responsibility for the procurement, design, fabrication, and alignment processes for the neutron guide system;
2. Leading research efforts focused on slits and secondary shutters;
3. Contributing to the localization of the guide system and spearheading research on integrated guide systems;
4. Undertaking additional tasks as delegated by the team leader.

### **Basic Qualifications:**

- PhD, or about to receive a PhD, in a mechanical science or related field;
- Background in particle physics or nuclear technology;
- Proficient in using software such as SolidWorks Ansys, etc.;
- Prior experience in vacuum device design and alignment experience
- Good interpersonal and communication skills (written and oral English).

## **No.12. Engineer - Remote Handling R&D**

### **Overview**

The main goal of this position is to develop advanced key technologies and key equipment for remote handling system and further improve remote maintenance capabilities to better ensure long-term stable operation of CSNS facility after high-power upgrades of target station.

### **Major Duties/Responsibilities:**

1. Develop key technologies and key equipment (such as pure water hydraulic heavy-duty manipulators, mobile robots, etc.) for remote handling system;
2. Participate in the construction and development of CSNS remote handling and shielding disciplines including academic research, project application, professional laboratory construction and management, etc.;
3. Participate in maintenance process development & optimization, daily remote operation training, and remote operation replacement & maintenance of core components or system equipment at CSNS target station.

### **Basic Qualifications:**

- PhD, or about to receive a PhD, in mechanical engineering or related field;
- Background in hydraulic, mechatronics, robot or nuclear technology;
- Proficient in using software such as 3D CAD, FEA, PLC, etc.;
- Prior experience in remote operation manipulator/robot or remote handling equipment design preferred;
- Good team spirit, strong interpersonal and communication skills (written and oral English).

## **No.13. Researcher - Advanced Materials Research for Laboratories**

### **Supporting**

#### **Overview**

Lab support has been being a key limiting factor for the commissioning of neutron instruments. This requires technicians/scientists not only be able to perform management and basic training of labs but also can provide professional technical support for sample preparation, processing, screening and characterizing by using advanced instruments in neutron closely-related scientific areas.

The main role involved in the position is to conduct high quality scientific research and assist users from various scientific areas for accessing advanced instruments from lab point of view. Particular emphasis will be on engaging the potential domestic and international companies to budget, procure and commission instruments in the future.

#### **Basic Qualifications:**

1. Ph.D. in materials physics and chemistry or condensed matter physics, or closely related field. At least two years' postdoctoral research experience is required;
2. A good ability to develop and conduct high quality research;
3. Very good oral and written proficiency in English;
4. Good communication skills and networking abilities;

#### **Preferred Qualifications:**

- Experience with neutron or synchrotron-based X-ray instrument design and operation;
- Experience with Magnetic Property Measurement System or Physical Property Measurement System;
- Skills in developing data reduction and analysis software related to X-ray or other advanced characterization techniques;

## **No.14. Researcher - Experimental Control**

### **Overview**

The main goal of this position is to undertake relevant business of experimental control on instruments and target station. Activities include upgradation and maintenance of control system on instruments and target station, such as software/hardware development for the experiment control, engineer design and deployment on instruments and target station control system, device installation and commissioning, field work of operation and maintenance.

### **Major Duties/Responsibilities:**

1. Undertaking the control business of the spectrometer and the target station;
2. Participating in the upgrading and maintenance of the control system on target station;
3. Participating in the development and deployment of the spectrometer experimental control system, responsible for relevant software development, hardware design & commissioning, equipment installation, operation and maintenance;
4. Participating in the development and further operation of the fast control electronics system;

### **Basic Qualifications:**

- Educational Requirement: PhD degree;
- Background in control engineering or computer science;
- Experience in PLC and power electronics technology development; possess certain hands-on and communication assistance skills;
- Proficient in using Linux system and Python language;
- Good English communication and writing skills.

## **No.15. Researcher - High Pressure Neutron scattering**

### **Overview**

The main goal of this position is for operation and maintenance of High Pressure Neutron Diffractometer (HPND) at CSNS, helping user to do neutron diffracting experiments combining in situ high pressure equipment as well as process the data using specific software. The HPND at CSNS is a dedicated diffraction instrument for users to study crystal and magnetic structure under high pressure.

### **Major Duties/Responsibilities:**

1. Conduct high quality research using high pressure techniques (combining temperature or magnetic field preferred).
2. Develop dedicated high pressure sample environment and other experiment required equipment for use on HPND.
3. Develop dedicated software needed for HPND.
4. Responsible for the data processing after neutron experiments done at HPND.
5. Responsible for the operation and maintenance of HPND.
6. Other works that is required.

### **Basic Qualifications:**

- PhD in a physical science, material science, chemistry or related field;
- Postdoctoral experience required;
- Background in using Synchrotron Radiation or Neutron Scattering to do research preferred;
- Proficient in using data processing software such as GSAS, FULLPROF, etc.;
- Prior experience in high pressure field preferred;
- Good interpersonal and communication skills (written and oral English).

## **No.16. Researcher - High-Energy Direct Geometry Chopper**

### **Spectrometer**

#### **Overview**

The objective of this project is to provide technical support for the debugging and operation of high-energy direct geometry chopper spectrometer. The technical support including but not limited to sample environment, experiment planning, simulation, data analysis and user service. The sample environment involves electrical, optical, and gas. We would like you to have experience in software development, particularly in Python.

#### **Major Duties/Responsibilities:**

1. Take on the task of developing new equipment for high-energy direct geometry chopper spectrometer, including sample environment, electrical, optical, and gas systems;
2. Research on theory and techniques of inelastic scattering;
3. Participate in the operation and debugging work of high-energy direct geometry chopper instruments.

#### **Basic Qualifications:**

- PhD, or about to receive a PhD, in a physical science or related field;
- Background in condensed matter physics;
- Proficient in using software such as Python, C and MATLAB etc.;
- Prior experience in neutron scattering experiments or software development;
- Good interpersonal and communication skills (written and oral English).

## **No.17. Researcher - Neutron Detector Research ( $^3\text{He}$ Tubes)**

### **Overview**

The main goal of this position is to study the detector physics and develop advanced thermal neutron detectors for the instruments of China Spallation Neutron Source phase II (CSNS II). The task will include detector physics research, Monte Carlo simulation, prototype development, engineering design and optimization, massive fabrication, installation and the commissioning. In addition to train doctoral students as a supervisor, you will also have the opportunity to collaborate with users and staff to develop new methods for neutron measurements.

### **Major Duties/Responsibilities:**

1. Conduct high quality research on detector physics using MC simulation and beam experiments;
2. Develop advanced thermal neutron detectors for the instruments;
3. Participate in detector development, massive fabrication, installation, commissioning and maintenance.

### **Basic Qualifications:**

- PhD, or about to receive a PhD, in particle physics and nuclear physics, nuclear technology or related field
- Background in detector physics or neutron detection.
- Proficient in using software such as Geant4, Garfield, ROOT, ANSYS, etc
- Prior experience in thermal neutron detectors preferred.
- Good interpersonal and communication skills (written and oral English).

## **No.18. Researcher - Engineering Material Neutron Diffractometer**

### **Overview:**

Engineering material neutron diffractometer (EMD) is a dedicated engineering science facility at CSNS. The EMD provides a world-class platform for measuring and analyzing the stress in large and complex engineering materials. The primary aim of this position is to ensure safe operation and user support of the beamlines. You will act as a local contact for users, including helping with experimental setup, data acquisition and data analysis. You will have the opportunity to work with users on a wide range of science topics covered by the instruments. It is expected that you pursue your own research program, focusing on neutron scattering capabilities.

### **Major Duties/Responsibilities:**

1. Assist users as a local contact for experimental setup and data acquisition, participate in user education as appropriate, and ensure users are provided with analyzable data when possible;
2. Pursue developments in instrumentation, sample environment, and software to help maintain and further advance the performance of the instrument suite;
3. Attract new users, both broadly and from areas related to residual stress analysis, to expand the user community and the impact of neutron scattering in the residual stress measurements;
4. To present the progress and results at national/international conferences and workshops.

### **Basic Qualifications:**

- Ph.D. in Materials Science, Engineering, or a related field;
- A strong record of productive and creative research demonstrated by publications in peer reviewed journals and presentations at scientific conferences;
- Experience with neutron/X-ray powder diffraction and Rietveld analysis is preferred;
- Experience with neutron measurements on residual stress determination is preferred;
- Experience in a neutron (TOF or Reactor) or synchrotron x-ray user facility is preferred;
- Experience with the design, installation, and commissioning of advanced scientific instrumentation in a laboratory or at a user facility is preferred;
- Proficiency in programming, such as Python or MATLAB is preferred;

## **No.19. Postdoctoral Researcher - General Purpose Powder**

### **Diffractometer**

#### **Overview**

The main purpose of this position is twofold, one is undertaking the daily operation and experimental work to ensure that the experiment is carried out normally, and the other is participating in the experimental data analysis and user work. Additionally, during the project process, you will also have the opportunity to conduct your own application research work in the field of neutron diffraction and stress related fields by using General purpose powder diffractometer (GPPD) spectrometer.

#### **Major Duties/Responsibilities:**

1. Undertake research in the application of neutron diffraction and stress-related fields in GPPD spectrometers;
2. Responsible for the daily operation and experimental work of GPPD spectrometers;
3. Participate in experimental data analysis and user interactions for GPPD spectrometers;
4. Responsible for the research and development of related equipment.

#### **Basic Qualifications:**

- Ph.D. degree in Materials science or Engineering;
- Background in materials research and crystallography;
- Proficient in the use of structural analysis software and mechanical property measurement instruments;
- Prior experience in neutron diffraction is preferred;
- Good English communication and writing skills.

## **No.20. Postdoctoral Researcher - Experimental Public Research**

### **Overview**

The main goal of this position is to develop the theoretical research of deuteration of nuclear grade resin and catalytic recombination of H<sub>2</sub>/D<sub>2</sub> and O<sub>2</sub> with high radiation environment. It will also involve the related process and equipment design, manufacturing and commissioning.

### **Major Duties/Responsibilities:**

1. Undertake the research and development of nuclear-grade resin deuteration devices;
2. Undertake research on hydrogen-oxygen catalysis and dehydrogenation devices;
3. Participate in the research and development of heavy water systems;
4. Participate in the assembly, commissioning and maintenance the water-cooling systems of target station.

### **Basic Qualifications:**

- PhD, or about to receive a PhD, in a radiochemistry field;
- Background in nuclear chemical engineering and radiochemistry;
- Proficient in using software such as ANSYS, SOLIDWORKS, etc.;
- Prior experience in heavy water reactor operations is preferred;
- Good English communication and writing skills.

## **No.21. Postdoctoral Researcher - Bio-medicine R&D**

### **Overview**

The main goal of this position is to engage in a structural biology research program. To develop new boron medicine for BNCT.

### **Major Duties/Responsibilities:**

1. Undertake the research and development of novel boron drugs;
2. Participate in the research and application of new methods in neutron and X-ray diffraction.

### **Basic Qualifications:**

- Ph.D. degree in Biochemistry and Molecular Biology;
- Background in Molecular Biology;
- Good English communication and writing skills.

## **No.22. Postdoctoral Researcher - High Pressure Neutron Scattering**

### **Research**

#### **Overview**

The main goal of this position is for part of operation and maintenance of High Pressure Neutron Diffractometer (HPND) at CSNS, helping user to do neutron diffracting experiments combining in situ high pressure equipment as well as process the data using specific software. Also conduct high quality researches depending on HPND instrument as well as high pressure techniques. The HPND at CSNS is a dedicated diffraction instrument for users to study crystal and magnetic structure under high pressure.

#### **Major Duties/Responsibilities:**

1. Conduct high quality research using high pressure techniques as well as HPND instrument (combining temperature or magnetic field preferred);
2. Develop dedicated high pressure sample environment and other experiment required equipment for use on HPND;
3. Develop dedicated software needed for HPND;
4. Responsible for the data processing after neutron experiments done at HPND;
5. Responsible for part of operation and maintenance of HPND.

#### **Basic Qualifications:**

- PhD in a Physical science, Material Science, Chemistry, Nuclear Technology, Geological Science, or related field;
- Background in using Synchrotron Radiation or Neutron Scattering to do research preferred;
- Proficient in using data processing software such as GSAS, FULLPROF, etc.;
- Prior experience in high pressure field preferred;
- Good interpersonal and communication skills (written and oral English).

## **No.23. Postdoctoral Researcher - Research on High-resolution**

### **Neutron Powder Diffractometer**

#### **Overview**

The high-resolution neutron powder diffractometer group within the Neutron Science Division in CSNS is constructing a new beam line of powder diffractometer, which is expected to reach a world-leading resolution of  $\Delta d/d < 0.05\%$ . The group seeks a postdoctoral researcher to carry out original research on magnetic materials by utilizing multiple neutron/X-ray/muons scattering techniques. The positions represent extraordinary opportunities to develop a world-class neutron instrument and conduct frontier research in condensed matter physics and materials science. Applications are sought from highly creative and motivated individuals who are majored in condensed matter physics or materials science and have demonstrated skills/experience in the diffraction technique.

#### **Major Duties/Responsibilities:**

1. Participate in the design of high-resolution neutron diffraction spectrometers;
2. Utilize neutron scattering, muon spin resonance, synchrotron radiation, and other methods to conduct research on the physical properties of magnetic materials.

#### **Basic Qualifications:**

- Ph.D. degree in Physics, Chemistry, or Materials Science;
- Experience in condensed matter physics;
- Prior experience in neutron scattering experiments is preferred;
- Good English communication and writing skills.

## **No.24. Postdoctoral Researcher - Neutron Backscattering Spectrometer**

### **Overview**

The Neutron Backscattering Spectrometer (NuBS) at CSNS is one of nine spectrometers planned by CSNS-II. NuBS will be dedicated to studies of sub-nanosecond nanometer-scale dynamics in materials using neutron backscattering. It has extreme high energy resolution, about  $\mu\text{eV}$ , and suits for both QENS and INS. The successful candidate will be based at NuBS and conduct independent research utilizing the state-of-the-art neutron techniques.

### **Major Duties/Responsibilities:**

1. Conduct high quality research using Neutron Backscattering techniques;
2. Work together with the members of the NuBS for design and construction of NuBS;
3. Participated in the user service at NuBS.

### **Basic Qualifications:**

- PhD, or about to receive a PhD, in a physical science or related field;
- Major in Physics, Material Science, or related field;
- Demonstrated experience in X-ray or neutron scattering;
- Ability to work independently as well as effectively in a collaborative team environment for solving scientific problems;
- Prior experience in Inelastic and Quasi-elastic neutron scattering is preferred;
- Prior experience in Matlab/Python/Labview programming is preferred;
- Good interpersonal and communication skills (written and oral English).

## **No.25. Postdoctoral Researcher – Data Analysis of Multi-Physics**

### **Instrument**

#### **Overview**

The main goal of this position is to participate the operation of Multi-Physics instrument (MPI) and conduct in-house research. Multi-Physics instrument is a total neutron scattering diffractometer focus on the materials has local disorder or disordered structure to measure both the Bragg and diffuse scattering. In this position, you will be expected to use density functional theory calculations to study the structure-property relationships of energy materials, advanced alloys, and functional polycrystalline ceramics.

#### **Major Duties/Responsibilities:**

1. Participate in the daily operation of the MPI;
2. Assist users for analysis of neutron total scattering data;
3. Perform theoretical calculations related to the team research.

#### **Basic Qualifications:**

- PhD, or about to receive a PhD, in a Physical Science or related field;
- Background in condensed matter physics or other related fields with the experience in first principles theory or molecular dynamics calculations;
- Proficient in atomic structure analysis software such as VASP and Lamps;
- Strong interpersonal and communication skills (written and oral English).

## **No.26. Postdoctoral Researcher – Material research in Multi-Physics**

### **Instrument**

#### **Overview**

The main goal of this position is to participate the operation of the Multi-Physics instrument (MPI) and conduct in-house research. MPI is a total neutron scattering diffractometer focus on the materials has local disorder or disordered structure to measure both the Bragg and diffuse scattering. In this position, you will be expected to develop process for enhance the performance of advanced energy materials such as lithium batteries and hydrogen-resistant alloy, and to understand the structure-property relationships via neutron diffraction or total scattering methods.

#### **Major Duties/Responsibilities:**

1. Participate in the daily operation of the MPI and support the general user program;
2. Assist users for total scattering data reduction and analysis;
3. Research on advanced energy materials such as lithium batteries and anti-hydrogen embrittlement alloys based on neutron diffraction or total scattering methods.

#### **Basic Qualifications:**

- PhD, or about to receive a PhD, in a Physical Science or related field;
- Professional background in Material Science, Physics and other related fields;
- Skilled use of conventional material characterization equipment such as XRD, EM, TE, EPMA and so on;
- Experience in GSASII/FullProf/PDFgui/RMCProfile or other neutron data analysis software is preferred;
- Good interpersonal and communication skills (written and oral English).

## **No.27. Postdoctoral Researcher - Magnetic Small Angle Neutron**

### **Scattering**

#### **Overview**

The main goal of this position is to develop new magnetoelastic alloys and use advanced neutron scattering technology to study the in-situ growth mechanism. We plan to achieve this objective through the following workflow: material preparation, basic characterization, in situ neutron magnetic scattering experiments, data analysis and fitting, and micro magnetic simulation. In addition to the common tasks above, you will also have the opportunity to collaborate with users and staff to process small angle neutron scattering (SANS) data of different materials, enabling them to more effectively translate their measurement results into knowledge.

#### **Major Duties/Responsibilities:**

1. Undertake the preparation and characterization of magnetoelastic alloys;
2. Conduct in-situ SANS experiments, data analysis, fitting, and micromagnetic simulation work;
3. Participate in the operation of SANS and user experiments.

#### **Basic Qualifications:**

- Ph.D. degree in Materials Science and Engineering or Materials Science and Engineering;
- Background in metal materials or magnetism;
- Proficient in using micromagnetic simulation software is preferred;
- Experience in experiments and data analysis with large-scale scientific instruments is preferred;
- Good English communication and writing skills are required.

## **No.28. Postdoctoral Researcher - Scientific Computing and Simulation Software Optimization**

### **Overview**

The IT department at CSNS is seeking a highly motivated Postdoctoral Researcher to join our team. The successful candidate will play a crucial role in the development of our scientific computing simulation platform and in the optimization and system integration of simulation software for major scientific and technological infrastructures on various hardware platforms, including GPUs and ARM architectures. This position represents a unique opportunity to contribute to the advancement of scientific research through computational innovation.

### **Major Duties/Responsibilities:**

1. **Scientific Computing Simulation Platform Development:** Undertake the research and development of the CSNS scientific computing simulation platform, enhancing its capabilities to support advanced scientific research.
2. **Simulation Software Optimization and System Integration:** Focus on the software porting, optimization, and system integration of simulation software for significant scientific infrastructures across different hardware platforms such as GPUs and ARM. This includes ensuring the efficient execution of software and leveraging the full potential of the hardware.

### **Basic Qualifications:**

- Ph.D. degree in Computer Science, Computational Physics, Engineering, or a related field.
- Proficiency in programming languages including C/C++, Fortran, and OpenCL. Knowledge of other relevant languages and technologies is a plus.
- Demonstrated experience in parallel programming and a strong understanding of parallel computing architectures.
- Familiarity with beam dynamics calculations, first-principles calculations, and other relevant scientific computing algorithms.
- Experience in the optimization of scientific software on various hardware platforms, particularly GPUs and ARM architectures.
- Excellent problem-solving skills, with the ability to tackle complex computational challenges in scientific research.
- Good communication skills, both written and verbal, with the ability to document and present research findings effectively.

## **No.29. Postdoctoral Researcher - R&D of Sample Environment**

### **Overview**

The main goal of this position is to develop non-standard or special sample environment equipment for neutron scattering. For example, the development of in-situ sample environments required for neutron scattering experiments such as low temperature, high temperature, high pressure, electric/magnetic field, soft matter, chemical reaction related experiments, and related experimental research work. At the same time, it is necessary to ensure the stable operation of the relevant sample environment equipment and comply with the work arrangements of superiors.

### **Major Duties/Responsibilities:**

1. Undertake the design, optimization, and calculation work related to sample equipment for extreme conditions;
2. Participate in the design and development, operation, and maintenance of sample equipment devices, such as low-temperature coupling superconductivity sample equipment, low-temperature coupling high-pressure sample equipment, and high-temperature coupling high-pressure sample equipment;
3. Participate in the design and development of autonomous sample environment equipment;
4. Participate in the operation, maintenance, and commissioning of high-pressure and low-temperature equipment.

### **Basic Qualifications:**

- PhD, or about to receive a PhD;
- Background in high and low temperature/high pressure/superconductivity/soft matter, and other related topics;
- Proficient in using software such as 3D design and finite element analysis, etc.;
- Prior X-ray, neutron scattering, or sample environment related research is preferred;
- Good interpersonal and communication skills (written and oral English).

## **No.30. Postdoctoral Researcher - Polarized Helium-3 Research**

### **Overview**

The main goal of this position is to develop new generation of  $^3\text{He}$  neutron spin filters for user-friendly and efficient filtering large-angle scattered neutron during the second phase of CSNS. The system including such as heating, pumping (by high power laser), and interlock, as well as NMR sub-system. Successful candidates will join an international research group and work on developing polarized neutron and polarized  $^3\text{He}$  technologies for the CSNS. The candidates will specifically be involved in developing a  $^3\text{He}$  spin-exchange optical pumping (SEOP) program within the polarization group for research in polarized neutron scattering, spin-exchange interactions, precision magnetometry, and lung MRI.

### **Major Duties/Responsibilities:**

1. Participate in the research and operation maintenance of polarized Helium-3;
2. Engage in the development of online polarized Helium-3 equipment;
3. Contribute to the research and development of wide-angle polarized Helium-3 devices;
4. Participate in the assembly, debugging, operation, and maintenance of online polarized Helium-3 equipment for the second-phase spectrometer.

### **Basic Qualifications:**

- Ph.D. in Particle Physics;
- Background in physics, optics, electrical engineering, or related fields;
- Proficient in using software such as SolidWorks, Zemax, Comsol, etc;
- Prior experience in electrical system design is preferred;
- Good English communication and writing skills.

## **No.31. Postdoctoral Researcher - MEOP $^3\text{He}$ Development**

### **Overview**

The Polarized Neutron Group at the CSNS is now seeking a postdoctoral research associate to join on-going research. Successful candidates will join an international research group and work on developing polarized neutron and polarized  $^3\text{He}$  technologies for the CSNS. The candidates will specifically be involved in developing a  $^3\text{He}$  metastability exchange optical pumping (MEOP) program within the polarization group for research in polarized neutron scattering, precision magnetometry, lung MRI, and spin-exchange interactions.

### **Major Duties/Responsibilities:**

1. Promote the scientific mission of the CSNS by developing new neutron polarization technologies;
2. Conduct research and development of a MEOP station for polarized  $^3\text{He}$ ;
3. Develop methods of laser polarimetry to measure the  $^3\text{He}$  polarization;
4. Develop gas compression and magnetic systems for applications with polarized  $^3\text{He}$ ;
5. Support the operation of polarization devices within the Polarized Neutron Group;
6. Document and publish your research results in scientific journals.

### **Basic Qualifications:**

- Ph.D. in physics, materials science, or closely related field;
- Experience with either neutron instruments or polarized  $^3\text{He}$ ;
- Experience with neutron polarization technology ( $^3\text{He}$  spin filters, supermirrors) is preferred;
- Experience with systems that included nuclear magnetic resonance, ultra-high vacuums, high-power laser systems, high magnetic fields (> 1 Tesla), magnetometry, plasma discharges, or hot glass work is preferred;
- Good English oral and written communication skills.

## **No.32. Postdoctoral Researcher - First-Principles Calculation**

### **Overview**

The main purpose of this position is to investigate structure and phonon dynamics of thermoelectric materials, BCS superconductors, or materials exhibiting negative thermal expansion from first-principles calculation and also neutron scattering experiments. First-principles study of electronic structure, electronic transport, parity, phonon, electron-phonon coupling, and superconductivity of two- and three-dimensional functional electronic materials, including thermoelectric materials, topological superconductors, Weyl semimetals, Li-ion batteries, carbon-based transistors, topological insulators, systems with CDW state, etc.

### **Major Duties/Responsibilities:**

1. Conduct high-quality research using DFT, MD, and neutron scattering experiments;
2. Develop related codes and perform high-efficient simulations of thermoelectric materials and superconductors;
3. Apply funds and process other necessary works in the research group.

### **Basic Qualifications:**

- PhD, or about to receive a PhD, major in physics, materials, or chemistry;
- Background in condensed-matter physics or material physics;
- Proficient in using computational techniques such as VASP, Quantum ESPRESSO, LAMMPS, or other DFT/MD codes;
- Prior experience in phonon transport, electron-phonon coupling, topological state, crystal structure prediction, machine learning, neutron scattering will be a plus;
- Good interpersonal and communication skills (written and oral English).

## **No.33. Postdoctoral Researcher - Computational Physics Software**

### **Developer**

#### **Overview**

The postdoctoral researcher will collaborate with a computational physics team within the Division of Neutron Science to contribute to our continuous effort of developing an in-house Monte Carlo neutron scattering simulation package (see <https://doi.org/10.1016/j.cpc.2023.109004>). The successful candidate is expected to conduct a high-quality scientific investigation on the performance of the package in reproducing the neutron instrument experimental signal, as well as noise, from first principles.

#### **Major Duties/Responsibilities:**

1. Design and implement the methodology for simulation-aided experimental data analysis;
2. Development of neutron scattering models and numerical implementation;
3. Computational material calculations.

#### **Basic Qualifications:**

- PhD, or about to receive a PhD, in a physical science or related field;
- Proven programming experience in C++ and/or Python;
- Experience in density functional theory and/or molecular dynamics calculations;
- Good written and oral communication skills in English;
- Experience in NCrystal or any neutron Monte Carlo packages is preferred.

## **No.34. Postdoctoral Researcher - Research on Neutron Beam Testing**

### **Overview**

CSNS is a newly-built user facility and open to the world, it includes 20 neutron instruments, of which 9 are on operation and 2 are on commissioning, and the remaining 9 will start the construction from this year in CSNS phase II project, including a neutron technology research and development test beam line (NTDS). NTDS aims to be the neutron beam research and test platform to serve the construction and operation of neutron instruments, and promote the development of neutron technology.

### **Major Duties/Responsibilities:**

1. Construction and operation of NTDS;
2. Research on neutron beam testing technology;
3. Research on new technologies and methods of neutron optics.

### **Basic Qualifications:**

- PhD, or about to receive a PhD, in a physical science or related field;
- Background in particle physics or nuclear technology;
- Proficient in using neutron Monte Carlo simulation software such as MCNP, FLUKA, Geant4 etc.

## **No.35. Postdoctoral Researcher - Neutron Scattering Computer/Data Scientist**

### **Overview**

Engineering material neutron diffractometer (EMD) is a dedicated engineering science facility at China Spallation Neutron Source (CSNS), located at Dongguan, China. The EMD provides a world-class platform for measuring and analyzing the stress in large and complex engineering materials. The primary aim of this position is to develop a software solution for user-friendly and efficient, automatic processing of large numbers of TOF neutron diffraction datasets. The automated processing includes single peak fitting, interpolation and a fundamental analysis for strain/stress visualization, texture pole figure calculation. In addition to developing workflows for streamlining common tasks, you will have the opportunity to engage with users and staff to develop new ways for working with their data that enable them to translate their measurements more effectively into knowledge.

### **Major Duties/Responsibilities:**

1. Convert the Mantid code for data reduction and normalization into a user-friendly interface, ensuring the generation of meaningful data outputs suitable for texture and stress pole figure analysis.
2. Collaborate closely with beamline staff and users to implement the necessary functionality.
3. Document the software comprehensively and provide training and support to our scientists and users in its utilization.
4. Present the progress and outcomes of the project at national and international conferences and workshops.

### **Basic Qualifications:**

- PhD in Computer Science, Physic, Engineering, Mathematics or related field;
- Proficiency in at least one programming language (Python, MATLAB);
- Experience in software development;
- Ability to generate performance-optimized code and ergonomic user interfaces;
- Ability to interact well with people of all backgrounds and experiences.

## **No.36. Postdoctoral Researcher - Thermal Neutron Scintillation**

### **Detector**

#### **Overview**

The main goal of this position is to study the detector physics and develop advanced thermal neutron scintillation detector for the instruments of China Spallation Neutron Source phase II (CSNS II). The task will include detector physics research, Monte Carlo simulation, prototype development, engineering design and optimization, massive fabrication, installation and the commissioning. In addition, you will also have the opportunity to collaborate with users and staff to develop new methods for neutron measurements.

#### **Major Duties/Responsibilities:**

- Conduct high quality research on detector physics using MC simulation and beam experiments.
- Develop advanced thermal neutron scintillation detector for the instruments.
- Participate in detector development, massive fabrication, installation, commissioning and maintenance.

#### **Basic Qualifications:**

- PhD, or about to receive a PhD, in particle physics and nuclear physics, nuclear technology or related field;
- Background in scintillation detector physics or neutron detection.;
- Proficient in using software such as Geant4, ROOT, ANSYS, etc.;
- Prior experience in scintillation detector preferred;
- Good interpersonal and communication skills (written and oral English).

## **No.37. Postdoctoral Researcher - GEM Detector**

### **Overview**

The main goal of this position is to study the detector physics and develop advanced thermal neutron GEM (Gas Electron Multiplier) detector for the instruments of China Spallation Neutron Source phase II (CSNS II). The task will include detector physics research, Monte Carlo simulation, prototype development, engineering design and optimization, massive fabrication, installation and the commissioning. In addition, you will also have the opportunity to collaborate with users and staff to develop new methods for neutron measurements.

### **Major Duties/Responsibilities:**

1. Conduct high quality research on detector physics using MC simulation and beam experiments.
2. Develop advanced thermal neutron GEM detector for the instruments.
3. Participate in detector development, massive fabrication, installation, commissioning and maintenance.

### **Basic Qualifications:**

- PhD, or about to receive a PhD, in particle physics and nuclear physics, nuclear technology or related field;
- Background in gas detector physics or neutron detection;
- Proficient in using software such as Geant4, Garfield, ROOT, ANSYS, etc.;
- Prior experience in GEM detector preferred;
- Good interpersonal and communication skills (written and oral English).

## **No.38. Postdoctoral Researcher - Neutron Imaging Detector**

### **Overview**

The main goal of this position is to study the detector physics and develop advanced neutron imaging detector for the instruments of China Spallation Neutron Source phase II (CSNS II). The task will include detector physics research, Monte Carlo simulation, prototype development, engineering design and optimization, massive fabrication, installation and the commissioning. In addition, you will also have the opportunity to collaborate with users and staff to develop new methods for neutron measurements.

### **Major Duties/Responsibilities:**

1. Conduct high quality research on detector physics using MC simulation and beam experiments.
2. Develop advanced neutron imaging detector for the instruments.
3. Participate in detector development, massive fabrication, installation, commissioning and maintenance.

### **Basic Qualifications:**

- PhD, or about to receive a PhD, in particle physics and nuclear physics, nuclear technology or related field;
- Background in imaging detector physics or neutron detection;
- Proficient in using software such as Geant4, ROOT, ANSYS, etc.;
- Prior experience in neutron imaging detector preferred;
- Good interpersonal and communication skills (written and oral English).

## **No.39. Postdoctoral Researcher - High-Speed Radiation Imaging**

### **Detector Algorithm**

#### **Overview**

The postdoctoral appointee will be dedicated to advancing real-time algorithm development for high-speed radiation imaging detectors, primarily based on AMD Xilinx FPGAs. This role is pivotal in addressing the challenges associated with managing the large volumes of data produced by large-array pixel detectors. The focus will be on devising data reduction strategies harnessing the capabilities of FPGAs, GPUs, or other suitable hardware platforms to optimize the imaging process. Alongside algorithmic work, the position requires active participation in hands-on hardware technology and beam tests to ensure the algorithms' performance in real-world scenarios.

#### **Major Duties/Responsibilities:**

1. Design and implement real-time algorithms for data processing and reduction in high-speed radiation imaging detectors.
2. Utilize advanced FPGA platforms, such as those offered by AMD Xilinx, to develop and optimize data reduction techniques.
3. Explore the use of GPUs or alternative hardware for efficient data handling and processing.
4. Collaborate closely with the detector team to apply these algorithms in practical beam tests and validate their effectiveness.
5. Contribute to the development and refinement of the detector systems, including hands-on work with hardware and testing equipment.
6. Document and present findings in team meetings and scientific publications, providing insight into algorithmic advancements and hardware innovations.

#### **Basic Qualifications:**

- Ph.D. in Electrical Engineering, Computer Science, Physics, or a related field with a focus on hardware and algorithm development.
- Strong background in Register Transfer Level (RTL) development, with practical experience in FPGA programming, preferably with AMD Xilinx tools.
- Demonstrated experience in developing data reduction algorithms for hardware platforms.
- Hands-on experience with hardware and familiarity with electronic testing instruments such as oscilloscopes and spectrum analyzers.
- Knowledge of digital circuit design, signal processing, and system integration.
- Proficiency in a programming language conducive to algorithmic development, such as C/C++/Python is preferred;
- Willingness to engage in experimental work and participate in beam tests to verify and improve upon algorithmic designs and implementations.

## **No.40. Postdoctoral Researcher - Data Analysis and Modeling of**

### **Inelastic Neutron Scattering**

#### **Overview**

The main goal of this position is to develop INS data analysis and modeling methodology, and construct a machine-learning based approach to predict the inelastic neutron scattering spectra of materials from the crystal structure, and increase friendliness in analysis and interpretation of INS spectra, and improve efficiency in using the limited INS measurement resources. Inverse geometry molecular vibration spectrometer (iMovies) is an upcoming time of flight (TOF) indirect-geometry spectrometers for INS. The similar operational instruments include TOSCA @ISIS, UK and VISION @ SNS, USA.

#### **Major Duties/Responsibilities:**

1. Conduct INS data analysis and modeling;
2. Design and develop inverse geometry molecular vibration spectrometer (iMovies) at CSNS;
3. Elastic/inelastic neutron scattering applications on batteries, fuel cell, catalysts, MOF, etc.

#### **Basic Qualifications:**

- PhD, or about to receive a PhD, in physical, chemical or materials science;
- Background in materials and DFT / MD / machine learning;
- Proficient in using software such as CASTEP, VASP, Gaussian, CP2K, Phonopy, Crystal, LAMMPS, ORCA, MATLAB, etc.;
- Prior experience in spectral data (Raman, IR and INS) analysis and modeling preferred;
- Good interpersonal and communication skills (written and oral English).

## **No.41. Post-doctoral Researcher - Neutron Surface Scattering**

### **Overview**

A dedicated neutron reflectometer with a horizontal sample geometry has been scheduled to specifically focus on the study of structure and formation of thin films (layers) as well as their response to environmental changes. The instrument will be particularly optimized for the areas of soft condensed matter, life science, and advanced materials with free liquid surfaces, liquid-liquid, solid-liquid and solid-air interfaces. The postdoctoral fellow will focus on instrument design as well by collaborating with the research fellow with particular emphasis on technology development, which is considered as a key for the success of the instrument proposal. This includes again either the neutron delivery system, sample stage system or sample environment devices. Outstanding candidates will be considered for the tenure-track position or long-term contract.

### **Major Duties/Responsibilities:**

1. Undertake the development and design of novel optical components, technologies, and operational modes for the reflectometer.
2. Engage in the optimization of the performance and physical design parameters of the liquid reflectometer spectrometer using McStas software simulations.
3. Participate in the research and development of new technologies and devices for neutron liquid reflectometry.
4. Contribute to the assembly, debugging, operation, and maintenance of the neutron reflectometer.

### **Basic Qualifications:**

- Ph.D. in physics, materials science, or closely related field;
- A good ability to develop and conduct high quality research;
- Experience with neutron and/or synchrotron-based X-ray instruments;
- Very good oral and written proficiency in English;
- Good communication skills and networking abilities;
- Experience with neutron or synchrotron-based X-ray instrument design and operation is preferred;
- Experience with neutron reflectometry and GISANS measurements is preferred;
- Skills in computer modelling and programming e.g., with McStas and with Python or other high-level languages is preferred;