VENUS

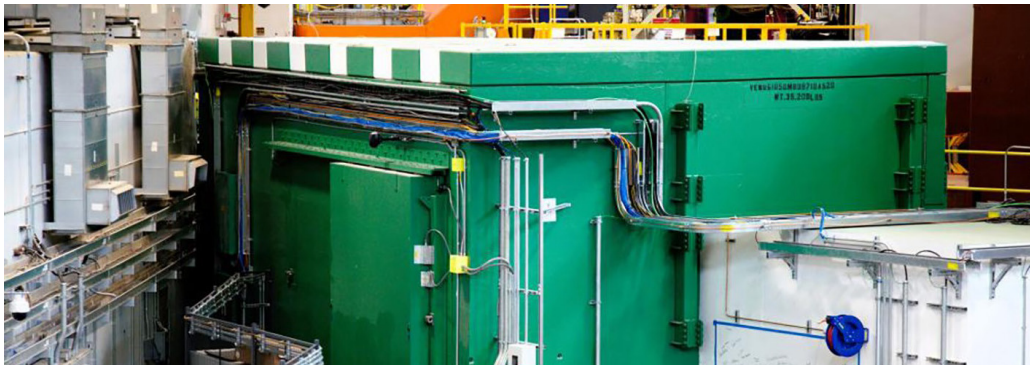
Versatile Neutron Imaging Instrument

Spallation Neutron Source

BEAMLINE
10

The VENUS neutron imaging beamline is a world-class instrument that uniquely leverages the pulsed neutron beam capabilities of the Spallation Neutron Source to measure and characterize large-scale and complex systems for U.S. research programs.

VENUS will contribute to the fundamental scientific understanding of natural and artificial materials in areas such as advanced alloys, alternative fuels, energy materials, nuclear materials, catalysis, geosciences, and plant physiology, as well as archaeological, biological, biomedical, and forensic applications.



APPLICATIONS

- Advanced alloys such as additively manufactured metals and high-entropy alloys
  - Grain mapping
  - 2D strain mapping
  - Porosity, comparison engineering drawings with neutron data, etc.
- Materials chemistry
- Energy materials
- Nuclear materials
- Transport and chemical reactions at micro-scale level and associated modeling
- Mechanical and physical behavior
- Fracture propagation, failure, and deformability under stress
- Geosciences and plant physiology
- Fluid flow studies, subsurface reservoirs for hydrocarbon production and CO_2 sequestration, petroleum
- Plant and soil interactions
- Transportation research and building technology
- Biological, biomedical and forensics
- Cultural heritage

EXPECTED PERFORMANCE

Beam Spectrum	Epithermal, Thermal, Cold
Moderator	H_2 decoupled poisoned (sharpest pulse at the SNS)
Wavelength bandwidth @ 60 Hz	~2.4 Å (Time-Of-Flight mode)
Spatial resolution	~100 µm
Resolution $\Delta\lambda/\lambda$ @ 1 Å	0.2 %
Source-to-detector distance	25 m
Sample-to-detector distance	A few mm to a few cm
Detection system and resolution	Cameras (Charge-Coupled Device; scientific Complementary Metal-Oxide Semiconductor) and Micro-Channel Plate detector
Field of view	Up to 20 × 20 cm²

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For more information, contact

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