

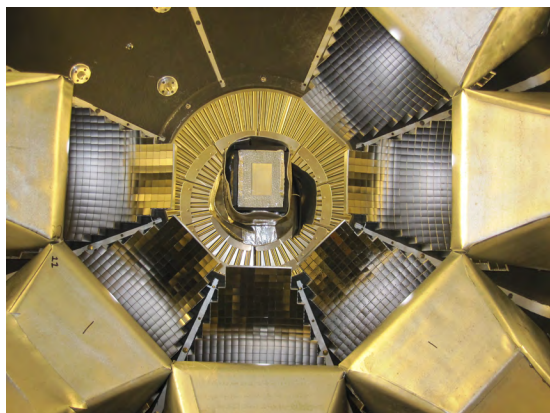
VISION

Vibrational Spectrometer

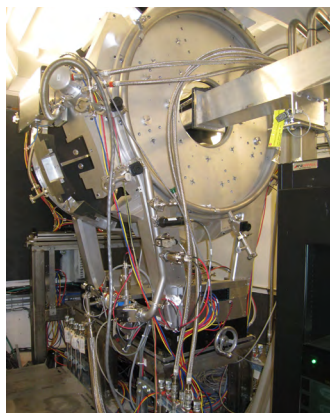
VISION is a high resolution broadband inelastic neutron scattering (INS) spectrometer. It is designed to study the vibrational dynamics of atoms in molecules and solids. A separate diffraction detector permits the simultaneous collection of powder diffraction data.

VISION is the neutron analogue of a Raman spectrometer and is optimized to characterize molecular vibrations over a broad energy range (-2 to 1000 meV) with an energy resolution of 1-1.5% over this range. It is equipped with double-focusing crystal analyzer arrays that focus the scattered neutrons on a small detector area. This design improves the signal-to-noise ratio of the instrument. The overall count rate for the inelastic signal is much larger than that of similar spectrometers currently available.

VISION gives unique insights in materials science by telling us not only “what atoms do” with spectroscopy, but also “where atoms are” with diffraction.



Inside view of the upstream double-focusing crystal array analyzers and corresponding beryllium filter assemblies.



Outside view of the spectrometer chassis, facing upstream.

APPLICATIONS

- Energy materials, chemistry, nanotechnology, surface chemistry, catalysis, biochemistry, hydrogen bonding, geochemistry and mineralogy, condensed matter science, etc.
- VISION facilitates routinely studying non-hydrogenous materials using INS
- VISION offers a wide variety of sample environment equipment, including cryogenic, furnace, in situ gas flow and gas loading, and high pressure (gas, clamp cells)

SPECIFICATIONS

Moderator	Decoupled ambient water
Source-to- T_0 chopper distance	7.6 m
Source-to-sample distance (primary flight path)	16 m
Sample-to-detector distance (secondary flight path)	0.732 m
Incident energy range	1–1000 meV
Analyzer Bragg angle	45°
Total analyzer area	0.7 m ²
Energy resolution	<1.5% $\Delta E/E$ ($E > 2\text{meV}$)
Elastic line width	150 μeV
Annular diffraction detector	1.3–14 \AA^{-1}
Backscattering diffraction bank	1.5–30 \AA^{-1}
$\Delta d/d$	10 ⁻²

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