G 3 BIS

Time of Flight Reflectometer EROS

Distance chopper to detector ..... 6.25 m
Distance sample to detector ..... 2 m
Wavelength range ..... 3 Å to 25 Å
Wavelength resolution ..... fixed $\Delta\lambda$ from 0.1 Å to 1 Å
Angular range ..... 0.1° to 6°
Angular resolution ..... 0.007° to 0.15°
Position of the surface ..... horizontal
Horizontal beam size at the sample ..... 25 mm
Vertical beam size at the sample ..... 0.5 mm to 10 mm
Detection ..... ^{3}He
Maximum intensity ..... 1000 count.sec^{-1} Å^{-1} at 3.5 Å
Background ..... 1 count.hour^{-1} Å^{-1}
Minimum measurable reflectivity ..... 5.10^{-6}
Typical acquisition time : ..... 4 h - 8 h (soft matter)

Ancillary equipment

★ Multireflections system for samples of 10 cm to 50 cm long
★ Furnace (60°C, 200°C)
★ Magnets with horizontal or vertical field between 0.001 T and 1 Tesla
★ Controlled temperature cells (from -40°C to 60°C) for liquid surface measurements
★ Polarizer and flipper for polarized neutron measurements

This reflectometer is dedicated to the study of interfaces by neutron reflection. The reflected intensity at grazing angle of a non polarized white neutron beam is measured as a function of wavelength. The variation of this reflection coefficient (reflectivity) with the wavevector is linked to the concentration profile perpendicular to the interface. If this profile is represented by a succession of different layers, the thickness, composition and roughness of each layer may be determined within the range from 2 to 500 nm for thickness and 1 to 20 nm for roughness. All type of interfaces might be studied, including air/liquid interfaces.

The reflectometer is installed at the end of the neutron guide G 3 bis. It is composed first of a chopper that produced the neutron bursts. Then, a 3.9 m evacuated collimator defined a very narrow neutron beam. Inside the collimator, a neutron supermirror enables the deviation of the beam towards liquid surfaces. The samples are installed on a goniometric head for alignment purpose. The reflected intensity is measured at a 2 to 4 m distance by single ^{3}He counter.

A polarizer and a flipper can be installed in order to perform polarized neutron measurements. A multireflections measurement system providing a better precision on the reflection coefficient when this one is close to one is available.

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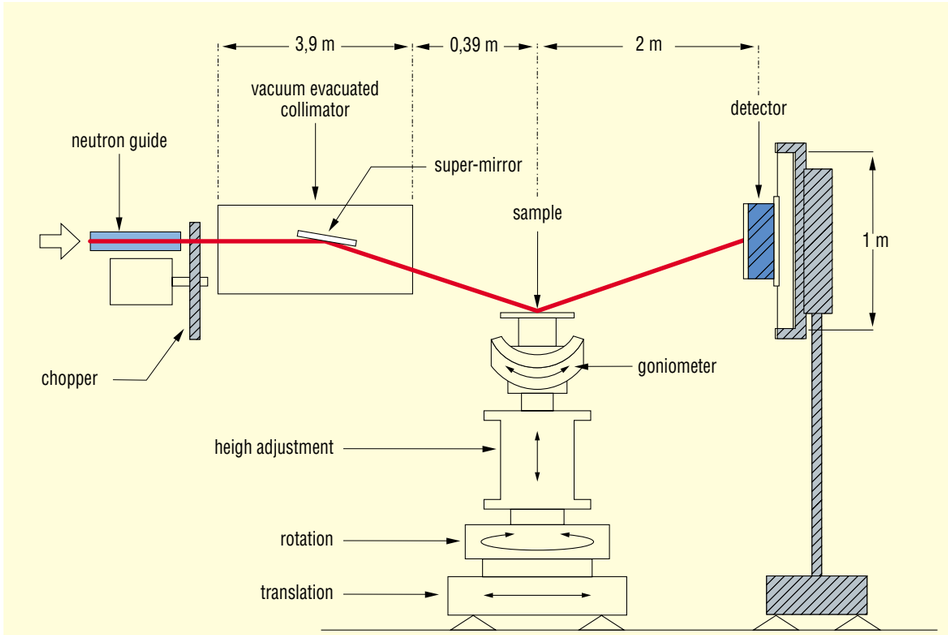

General layout of the spectrometer G 3 BIS.

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