Areas are given..... Width x height
Beam tube..... Right beam of tangential channel 4 F
aimed to cold source SF2
Monochromator..... Double monochromator set-up
M1 : pyrolytic graphite h = 0.4°
11x8.5 cm^2 computer controlled vertical focussing
M2 : pyrolytic graphite h = 0.4° 11x8.5 cm^2
Analyzer..... Flat pyrolytic graphite h = 0.4 ° 7.5x5 cm^2
Horizontally curved pyrolytic graphite 6x6 cm^2
Flat Ge (111)
Collimations..... In pile : 50', 30', 15'
between M1-M2 25' (optional)
others : 60', 40', 20', 10'
Range of monochromator angle..... $31° < 2\theta < 149°$
Range of scattering angle..... $-2° < \phi < 150°$
Range of analyzer angle..... $-150° < 2\theta_A < 150°$
Range of crystal orientation..... $0 < \psi < 350°$
Beam size at sample..... 2 x 4 cm^2
Detector..... ^3He ∅ = 5 cm h = 15 cm
Incident wavelength (wave-vector)..... $2 < \lambda_i$ (Å) < 6.3 $(3.2 > k_i (Å^{-1}) > 1)$
Scattered wavelength (wave-vector)..... $1.6 < \lambda_f$ (Å) < 6 $(4 > k_f (Å^{-1}) > 1.05)$

ki ($Å^{-1}$)	1.05	1.55	2.66
Maximum energy creation (THz)	-	0.75 (3 meV)	3.1 (12 meV)
Best energy resolution (Ghz)	2.3 (9 μeV)	13 (50 μeV)	80 (320 μeV)
Typical energy resolution (Ghz)	7 (30μeV)	56 (220μeV)	300 (1,2 meV)
Maximum wave-vector transfer ($Å^{-1}$)	1.9	3	5.1
Best wave-vector resolution ($Å^{-1}$)	3.10^{-3}	$5\ 10^{-3}$	$.9\ 10^{-3}$
Flux at sample (n/cm2 sec.)	-	$3.5x10^6$	$14x10^6$

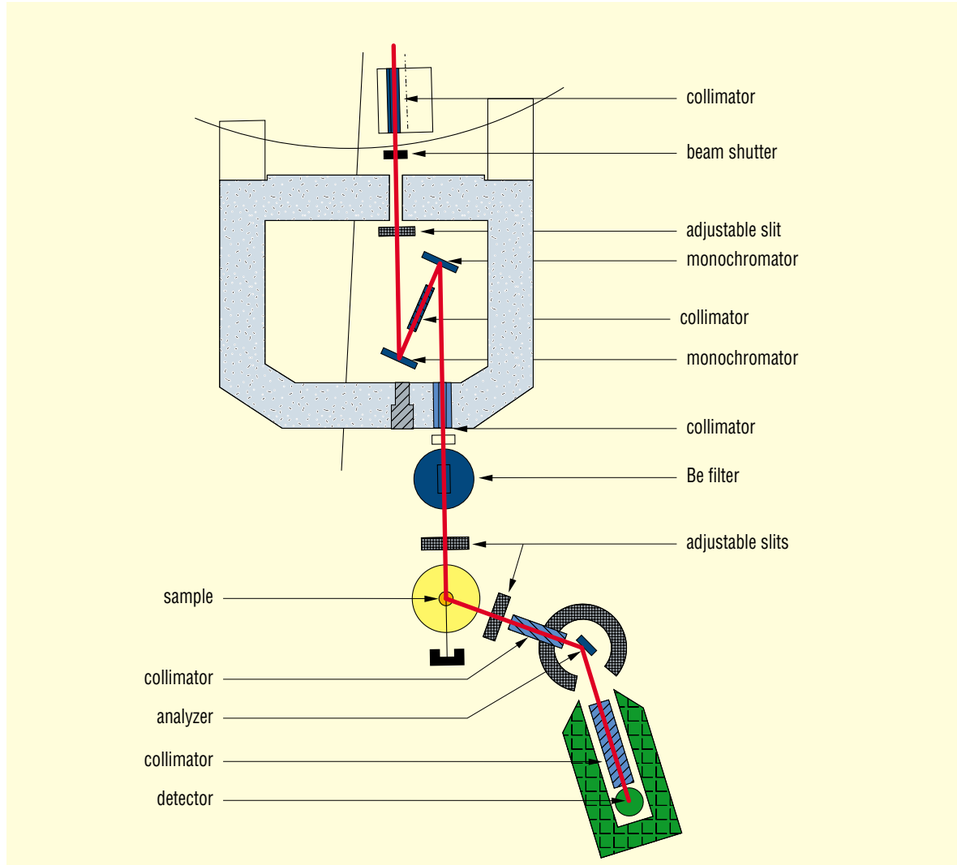
Ancillary equipment

★ Be filter (77 K)
★ **"Triple Axis Equipment Pool"**
(see on front of this chapter)

4F1 and 4F2 are twin 3-axis spectrometers with very similar characteristics (see description below), which are fed by a liquid-hydrogen cold neutron source.
Polarized neutrons are only available on 4F1 (see 4F1 page).
These spectrometers are designed for measuring dispersive excitations with low energy transfers (w < 4 meV, n < 1THz) with a good resolution and a high flux (see Table).
They are well suited for measuring acoustic phonon dispersions, soft phonons, spin waves, quasi-elastic scattering, as well as for fine studies of modulated structures.
They are equipped with a double pyrolytic graphite monochromator, providing wavelengths between 6 and 2 Å (1.05 < ki < 2.7 $Å^{-1}$. Available collimators are (60', 30',15') before and (60', 40', 20', 10') after the monochromators. An optional collimator (25', 15') can be added between the two monochromators. The monochromator has a computer-controlled vertical focusing.
The incident beam can be filtered by a cooled Be or a graphite filter.

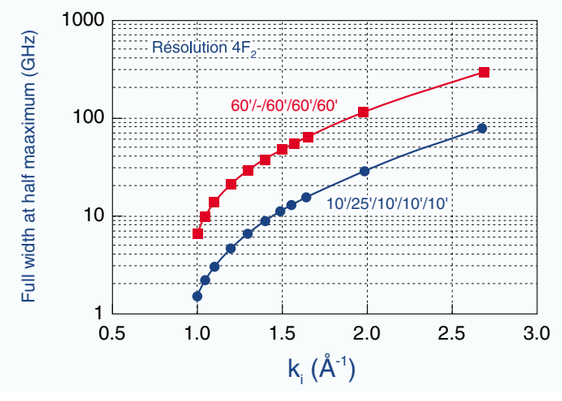
The pyrolytic graphite analyzer is normally used in a horizontally focusing geometry. In this mode, the curvature of the analyzer is controlled by the computer, and the collimators (60', 40', 20', 10') are replaced by wedge-shaped tunnels.
The sample table is equipped with two orthogonal non-magnetic goniometers, allowing tilts of ± 20°. Their upper face (serving as a support for the various sample environments) is located 270 mm below the axis of the beam.
The sample-to-monochromator and sample-to-analyzer distances can be adjusted to accommodate various sample environments.
The spectrometer is controlled by a SUN computer running under Unix/Solaris OS. It allows various data processing softwares, including fit and convolution programs, to be run in real time during the measurements.

Cold Neutron Three Axis Spectrometer 4 F 2



General layout of the diffractometer 4F2

Energy resolution (GHz) as a function of the incident wave-vector ki. Collimations are respectively: in-pile/M1-M2/M2-sample/sample-analyzer/analyzer-counter



Responsibles : **D. Petitgrand** **e-mail : petitg@llb.saclay.cea.fr**