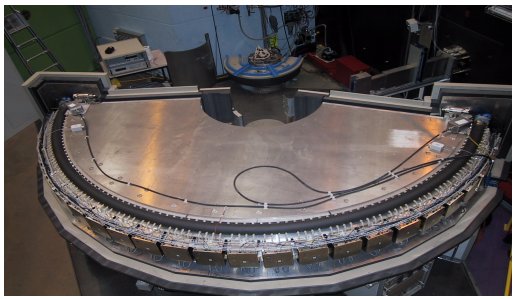
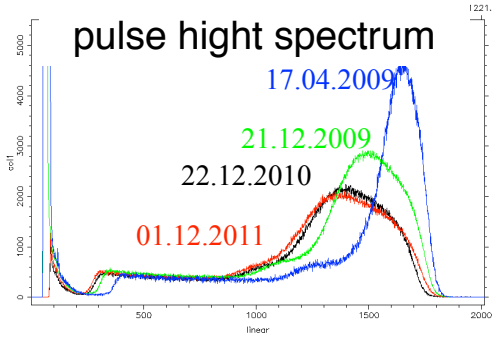
HRPT - High Resolution Powder Diffractometer for Thermal Neutrons

Instrument responsibles: Vladimir Pomjakushin and Denis Sheptyakov

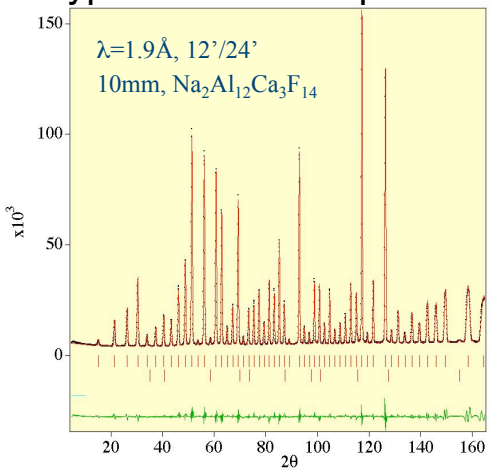
Detector

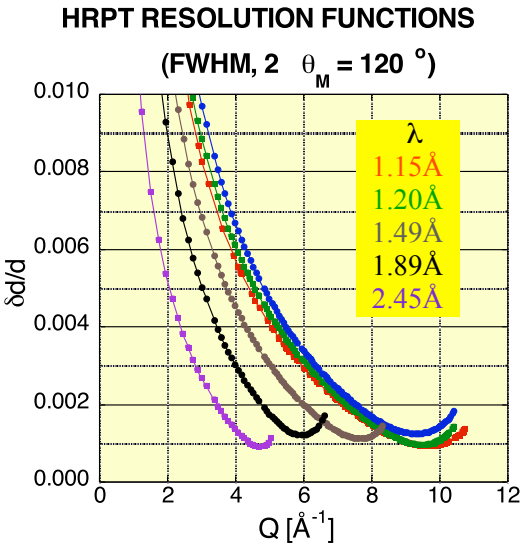
- ^{3}He (3.6 bar) + CF_4 (1.1 bar), length 3.5 cm, 15 cm hight
- Volume 100L, Voltage -6.7kV
- Efficiency 80% @ 1.5 Å
- 1600 wires with separation 0.1° (2.6 mm), 1500 mm to sample
- gas mixture cleaning/adding system





Typical diffraction pattern





HRPT features

- Neutron wavelengths (0.94-2.96) Å
- Range of 2θ=0-165° →high Q ≤ 13 Å^{-1}
- High resolution δd/d =10^{-3}
- Vertically focusing wafer Ge(hkk)monochromator 28.5cm high, total mosaic halfwidth 15'
- Flexible resolution/intensity:
  - primary beam collimations 6', 12', 24'
  - slit system for secondary collimation <40'
  - monochromator take-off-angle 90° and 120°
- Oscillating mylar-Gd_2O_3 radial collimators to eliminate Bragg peaks from sample environment (FWHM 14 mm and 7 mm) such as from cryostat furnace or pressure cell
- Low background. ≤30 mm^3 sample is possible
- Sample environment
  - platform for experimental infrastructure
  - 8- (room T), 4-samples (>1.5K) computer controlled sample changers
  - zero matrix pressure cells (9 , 15 , 100 kbar)
  - standard LNS sample environment: T=80mK —1800K, H=5T(vertical)
  - automatic He, N_2 refilling