Super D2B - high resolution powder diffractometer

- D2B is 15 years old, and was part of the 1984 2ieme souffle with D19 and D20
- D2B is often the most demanded of ILL machines (number of users & papers)
- D2B has produced the most cited papers (zeolites, superconductors, GMR materials...)
- We propose an order of magnitude gain in intensity, and corresponding higher resolution
Super D2B - high resolution powder diffractometer

Number of citations to ILL publications (most = 646 compared with average ~10)

- **466 (D1A)** Capponi, J. J. et al. (1987) Europhysics Letters. 3, 1301. *Structure of the 100K superconductor Ba2YCu3O7 between 5-300K by neutron powder diffraction.*
- **125 (D1A)** Roth, G., et al (1988) Physica C. 153-155, 972. *Crystallographic study of the tetragonal high-Tc-superconductor YBa2(Cu0.95Fe0.05)3O7.*
- **102 (D2B)** Hewat, A. W. (1987) Solid State Communications. 64, 301. *Structures of superconducting Ba2YCu3O7-delta and semiconducting Ba2YCu3O6 between 25 degrees C and 750 degrees C.*

[http://www.ill.fr/dif/citations/](http://www.ill.fr/dif/citations/)
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Giant Magneto-Resistance (Fernandez-Diaz, Suard, Radaelli et al.) ILL Report 1997

Charge ordering? Stripes or no stripes? GMR Mechanism? Magnetic structure?
Super D2B - high resolution powder diffractometer

- More detectors (x2)
- Bigger detectors (x3)
- More efficient monochromator (x2)
- Smaller samples
- Higher resolution
- Faster T, P scans
Super D2B - high resolution powder diffractometer

- More detectors - 128 high pressure He3 tubes of 2 cm diameter
  High resolution collimators reduced from 20mm to 12mm width
  Similar collimators already produced - commercially available.

- Bigger detectors - 300 mm high detectors & collimators as already used for incident beam, replacing 100mm detectors/collimators.
  Again, such detectors are commercially available.

- More efficient monochromator - horizontal focusing as well as vertical focusing.
  Separate from the detector replacement. Requires development.
Super D2B - high resolution powder diffractometer

What will it Cost?

- Each collimator+detector would cost ~ 30 kFF: total 3.8 MF
- New shielding: 0.5 MF
- New mechanics (mainly re-used): 0.5 MF
- Eventually new monochromator (separate from det.): 1.5 MF
- Total cost: 4.8 + 1.5 MF