ILL Millennium Programme
New Materials studied with New Machines
Alan Hewat, ILL Diffraction Group

Super-D2B High Resolution Diffractometer
- Very high resolution of complex structures
- Large array of fine collimators/detectors
- Structure of hydrogen storage in metals
- Energy-efficient superconducting materials
- New phases of ice & hydrogen bonding
- Magnetic & magneto-resistive materials

Cd-shielding

Neutron beam

Electrolyte

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New D4 Liquids & Amorphous Machine
- Hot, short wavelength neutron beam
- Array of micro-strip detectors
- Atomic structure of amorphous materials
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New D3 and He+ Polarised Neutron Filter
- Laser-pumped polarisation of He+ filter
- Intense magnetic field & low temperature
- Hot neutrons for high structural resolution
- Neutron polarimetry for magnetic materials
- New complex magnetic structures
- Subtle bonding effects between atoms

VIVALDI Image Plate Detector
- Very intense white neutron beam
- Electronic photography using image plates
- Reciprocal space exploration
- Study of structural & magnetic transitions
- Structure of new quasi-crystalline materials

New D20 High Intensity Diffractometer
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- Electro-chemistry of efficient batteries
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- Very efficient protein/fibre diffractometer
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Neutron Strain Scanner
- Stress-strain in large industrial components
- Very intense, finely focussed neutron beam
- Precise orientation of large objects
- Cracks in jet turbine engines
- The strength of welds in oil pipelines
- Work hardening of railway lines

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