

# SALSA, Strain Analyser for Large and Small Scaled engineering Applications

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Within the framework of ILL's Millennium Instrument Development Programme, started in 2000, ILL in collaboration with a team led by the University of Manchester and funded by the UK Engineering & Physical Sciences Research Council set about building an instrument dedicated to measuring engineering strain: SALSA ("Strain Analyser for Large and Small scale engineering Applications").

SALSA is designed for most flexible sample manipulation and a broad bandwidth of applications, requiring high resolution **and** high penetration. A unique feature is the sample manipulator, a hydraulic driven Stewart Platform. This is a robot with six degrees of freedom allowing precise scanning of large (500 kg and up to 1.5 m long) samples along any trajectory involving translations, tilts and rotations. It is at the same time precise enough to position small samples within 10  $\mu\text{m}$ .

The Silicon double focussing, bent crystal monochromator makes very efficient use of the neutron beam, supplied by the new super mirror guide and providing the high resolution required for strain scanning. Fully automated beam optics, a 2-Dim Position Sensitive Detector and a TV-camera based metrological system complete the instrument. For surface and interface studies radial collimators will be available.

SALSA is now in the commissioning phase and will be open for users from June 2005 on. It has already shown its capabilities of measuring multi-pass and friction welds in steel and aluminium, quenched nickel plates, Ti-alloys for aeronautical engineering and composite materials. Short acquisition times, good angular resolution ( $<0.3^\circ$   $2\theta$ ) and very comfortable and precise sample manipulation were the first positive observations.



**Figure 1:** SALSA with an aero-engine fan-blade on the sample stage

## References

T.Pirling, G.Bruno, P.Withers, SALSA – A New Instrument for Strain Imaging in Engineering Materials & Components, sent to Materials Science and Engineering A