

Instrumentation:

1. Enraf Nonius Delft Diffractis 583 X-Ray Generator with 3.5 kW output with normal or fine focus or 5.5 kW with broad focus. Coupled to a Bede model 6 Diffractometer and a Bede Enhanced Dynamic Range(EDR) Detector .Bede Minicam Interface System(IEEE 488 interface)
2. Rigaku RU-200 Rotating Anode X-Ray Generator with Graphite monochromator; 12 kW output, Point & Line Focus beams, Cu target. Coupled to a Huber 4-Circle Diffractometer(Eulerian Cradle 511.5) and a Bicron NaI Scintillation Detector.

Under Development:

Rotating Anode XRG with 4-circle diffractometer, 4-bounce high-resolution monochromator and Single bounce Analyzer (for triple-axis diff., grazing incidence x-ray reflectometry, rocking curves).

This system will be capable of providing detailed information on crystal orientation of epitaxial films, film thickness, composition and strain (triple crystal diffraction) as well as 2D reciprocal space maps of scattered intensity in the plane of diffraction, and interface roughness at the atomic scale(reflectometry).

Computing Equipment:

Compaq Deskpro 2000 P200 MMX Computer

Two Compaq Proliant 2500 PP2000 Computers

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High Resolution Crystal X-Ray Diffraction Laboratory of the Materials Research Instrument Facility (MRIF)

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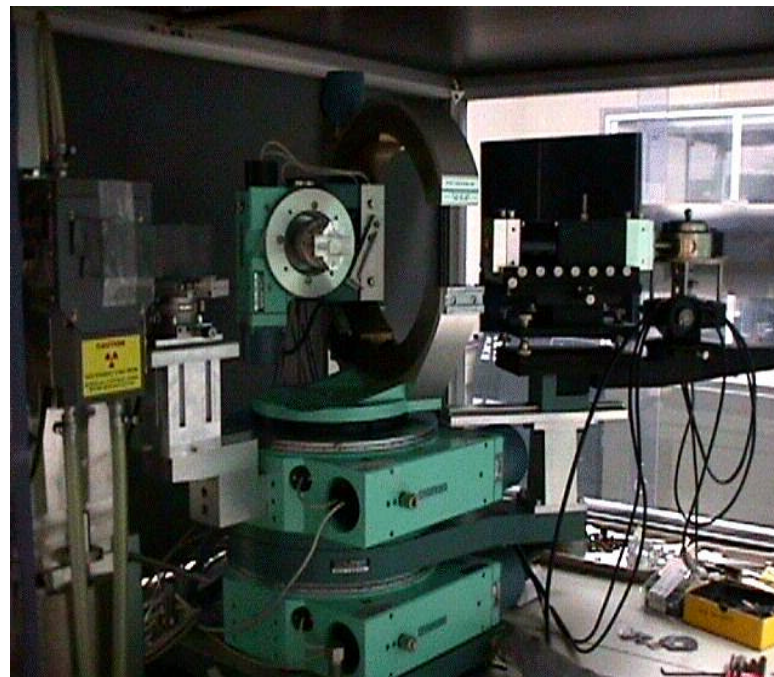
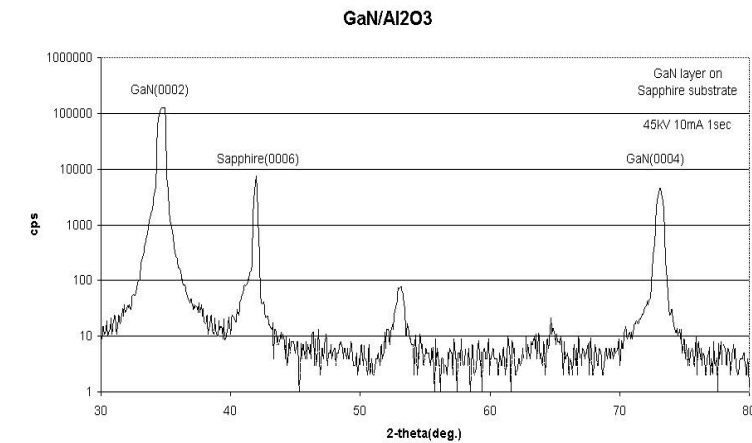
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Huber/Rigaku Diffractometer

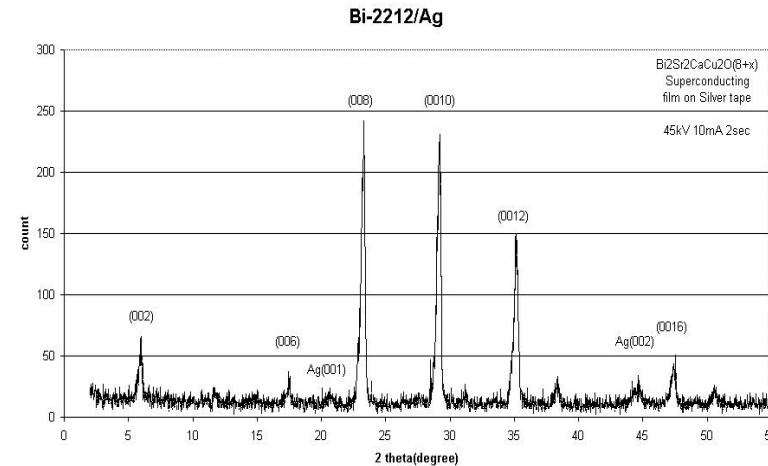
Capabilities:

The High Resolution X-Ray Laboratory is equipped with a double crystal diffraction system for measuring X-Ray rocking curves of single crystal epitaxial layers, multiple quantum wells, superlattices or arbitrary multilayer structures. Layer thickness, layer composition and strain, and layer quality can be determined. A Rotating Anode X-Ray Generator with 4-circle Diffractometer is also available for measurements on



Rotating Anode X-Ray Generator

thin-film samples. Theta-2 Theta diffraction profiles can be obtained with this system. The measurements are used to determine the crystallinity of the film and its preferential orientation. Computer codes for more quantitative analysis, such as the relative quantity of a given orientation, etc. are presently being developed.



Single Crystal Diffractometer

Objective:

The High Resolution X-Ray Laboratory provides analysis of single crystal thin films and layered structures. Presently, quantitative information about film thickness, strain, composition and crystalline quality can be obtained routinely, and more extensive analysis capabilities are being developed. Services can be provided for sample analysis, or for longer term projects, operators can be trained.

