

System Requirements

1. X-ray Supply, consisting of:
 - a. Built-in x-ray generator
 - b. Modular high-power X-ray tube, with ceramic body, Cu Anode energized for diffraction with up to at least 60 kV, under total power of at least 1.8 kW.
 - c. Tube must be modular for quick interchange from "point" to "line" source configuration without realignment.
2. Data acquisition and electronics
 - a. Must include a proportional detector with high dynamic range and extremely low background noise, less than 0.2 CPS
 - b. Option must be provided for using two detectors for efficient, sequential rocking curve and triple axis measurements.
 - c. Must include detector high-voltage converter and dual scaler board
 - d. Diffractometer Controller console
 - e. Data collection software
 - f. Analytical software for rocking curve simulation to determine composition, strain, thickness and tilt orientation in the wafer
 - g. Diffraction Space (reciprocal space) mapping for less perfect materials
3. Open Eulerian Cradle with X-Y-Z sample stage
 - a. Must permit X-Y translation of the test wafer in a range of at least 75 mm.
 - b. Must permit tilt and azimuthal rotation of the wafer in 0.01 degree steps.
 - c. Must be equipped with proper counterweight for stability and balanced, vibration-free operation of the diffractometer
4. Wafer holder
 - a. Wafer size: to 100 mm.
 - b. Minimum Spatial Resolution: 0.1 mm.

Performance Requirements

1. Materials requirements:
 - a. Must demonstrate satisfactory application to typical materials such as Si and GaAs, by producing rocking curves of near theoretical FWHM.
 - b. Visual display of data by graphics, labeling, titling, and on-screen measurements.
 - c. Data must be exportable to user as readable text files for further analysis.