

Specular and off-specular reflectivity from multiple quantum wells and quantum dot semiconductor devices

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Some measurements of the specular reflectivity of MQW and QD devices have been made using the reflectometer designed by Creagh for use at a rotating anode source (IM Jamie, SA Holt, TJ Dowling and DC Creagh [1996] International Schools and Conference on X-ray Analytical Methods, Sydney). This paper describes the use of synchrotron radiation in our research program. Experiments have recently been undertaken at BIGDIFF, the vacuum diffractometer at the Australian National Beamline Facility at the Photon Factory (DJ Cookson, RF Garrett, GJ Foran, DC Creagh and SW Wilkins [1992] Japanese J Synchrotron Radiation 6, 127-130). Counting techniques have been used to establish the specular reflectivity of these devices, and the results are compared with those gained with the rotating anode source. The off-specular reflection has been measured using imaging plate techniques, using an IP changer devised by Foran and Gentle(1997: to be published). Ten imaging plates can be exposed without breaking the vacuum. The scattered intensity distribution from the sample at angles of incidence corresponding to regions of interest in the Fresnel region of specular reflectivity curve has been measured, and the variation of the off-specular reflection with angle of incidence has been determined.