

Abstract Submitted
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Interfacial Structure, Bonding and Composition of InAs and GaSb Thin Films Determined Using COBRA CODRIN CIONCA, Physics Department, University of Michigan, DONALD ALAN WALKO, Advanced Photon Source, Argonne National Laboratory, YIZHAK YACOBY, Racah Institute of Physics, Hebrew University, CATALINA DORIN, JOANNA MIRECKI MILLUNCHICK, Materials Science and Engineering, University of Michigan, ROY CLARKE, Physics Department, University of Michigan — We have used Bragg rod x-ray diffraction and Coherent Bragg Rod Analysis (COBRA) direct phase retrieval method to extract atomic resolution electron density maps of a complementary series of heteroepitaxial III-V semiconductor samples. From the 3D electron density maps we derived the spacing between monolayers, the chemical composition and the distribution of bond lengths for all atomic planes in the film and across the interface with the substrate. InAs films grown on GaSb (001) using different As species (dimer or tetramer form) both showed conformal roughness and mixed GaSb/InSb interfacial bonding character. The tetramer conditions favored InSb bonding at the heterointerface; the percentages corresponding to InSb and GaAs bonding were equal in the case of the dimer. The GaAs film grown on InAs (001) displayed significant In and As interdiffusion and had a significant percentage of GaAs-like bonds at the heterointerface.

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