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Interfaces as tools in the design of short period type-II InAs/GaSb superlattices for mid-IR detection FRANK SZMULOWICZ[1], HEATHER HAUGAN[2], GAIL BROWN, K. MAHALINGAM[3], Air Force Research Laboratory, B. ULRICH, Bowling Green State University, S. MUNSHI, Air Force Research Laboratory — The effect of interface anisotropy on the electronic structure of InAs/GaSb type-II superlattices is exploited in the design of thin-layer superlattices for mid-IR detection threshold. The design is based on a theoretical envelope function model that incorporates the change of anion and cation species across InAs/GaSb interfaces, in particular, across the preferred InSb interface. The model predicts that a given threshold can be reached for a range of superlattice periods with InAs and GaSb layers as thin as a few monolayers. A number of superlattices with periods ranging from 50.6 to 21.2 angstroms for the 4 micron detection threshold were grown by molecular beam epitaxy based on the model design. Low temperature photoluminescence and photoresponse spectra confirmed that the superlattice band gaps remained constant at 330 meV although the period changed by the factor of 2.5.

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