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## Butt-Coupling Loss of 0.1 dB/Interface in InP/InGaAs Multi-Quantum-Well Waveguide-Waveguide Structures grown by Selective Area Chemical Beam Epitaxy

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**Abstract:** The lateral coupling of waveguiding structures in both [011] and  $[\bar{0}11]$  directions is studied using embedded selective area epitaxy by Chemical Beam Epitaxy. All growth steps are carried out under the same growth conditions on (100) InP substrates misoriented by  $0.5^\circ$  towards (111)B. Both planar and selectively grown material exhibits bright luminescence and narrow PL line widths (8 meV FWHM at 4K), up to the lateral junction. Moreover, no degradation of the original material properties is observed after regrowth. SEM images show very flat layers and excellent lateral coupling for all four types of junctions. After reactive ion etching of waveguide ridges, the optical losses have been determined using a Fabry-Perot setup at 1530 nm (TE polarization). Values of 0.1 dB/interface with excellent uniformity are presented. From our results we conclude that by optimization of the sample preparation prior to regrowth, values of 0.1 dB/interface can be obtained reproducibly for both perpendicular coupling directions.

**Key Words:** integrated optics, butt-coupling, SAE, CBE

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