CADtronics

- ✓ Provides accurate calculations of heterostructure band gaps (i.e., superlattices, quantum wells, alloys, etc.), nanoscale quantum-coherent phenomena (such as electron spin coherence times T1 and T2), optical properties (absorption, luminescence, and lasing), and carrier scattering and lifetimes.
- ✓ A semi-empirical CAD engineering software that calculates the properties of materials formed from layered semiconductors. It incorporates empirical parameters that are adjusted to fit experimental data and observations.

Capabilities

- ✓ Design optoelectronic devices, such as light-emitting diodes (LEDs), photodetectors, sensors, modulators, photovoltaic systems, and lasers
- ✓ Engineer spintronic devices such as spin LEDs, spin lasers, etc, allowing the characterization and forecasting of quantum coherence/decoherence effects
- ✓ Calculate band structures, the bandgap, the density of state, coupling strengths, and optical properties, such as absorption, photoluminescence, and radiative rates as a function of carrier concentration.

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Our CAD software, which is focused on the simulation of noise on a microscopic scale, provides quantitatively accurate calculations and simulations of nanoscale quantum-coherent phenomena for optoelectronic and spintronic devices in real-world environments.

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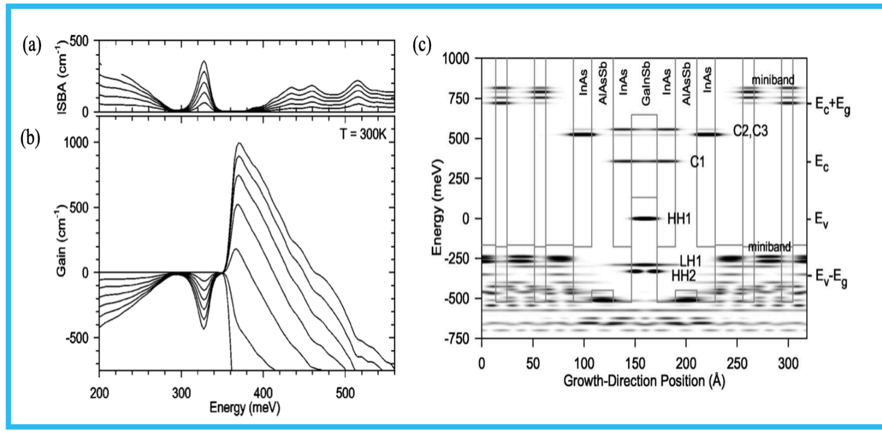
CADtronics

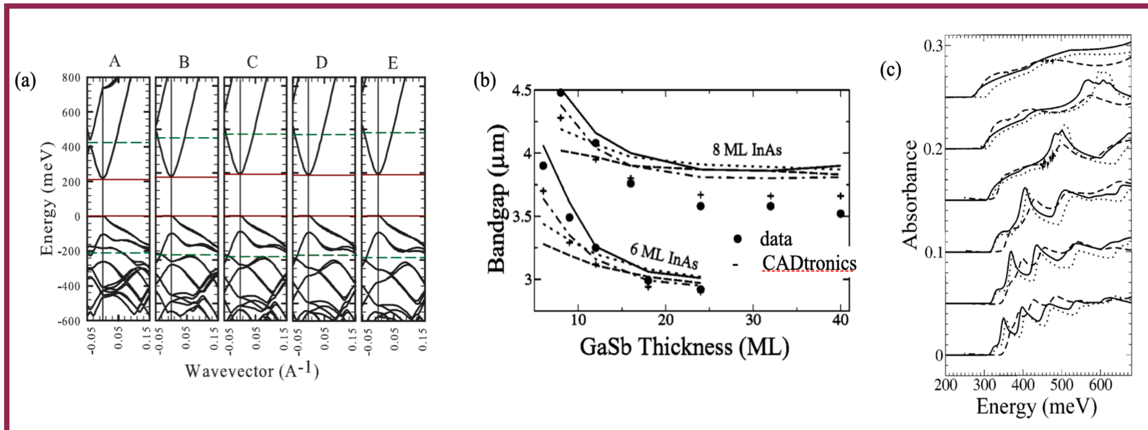
A SOFTWARE SUITE CAPABLE OF IDENTIFYING MICROSCOPIC SOURCES OF NOISE THAT DEGRADE QUANTUM DEVICES

CADTRONICS PROVIDES SOLUTIONS THAT OPTIMIZE MATERIALS AND STRUCTURES FOR VARIOUS OPTOELECTRONICS AND SPINTRONICS APPLICATIONS.

BY DETECTING FEATURES AND SOURCES OF NOISE, CADTRONICS MAKES IT POSSIBLE TO IMPLEMENT EFFECTIVE NOISE-REDUCING STRATEGIES DURING THE DESIGN STAGE, SAVING TIME AND RESOURCES AND REDUCING COSTS.

Mid-infrared InAs/GaInSb laser diode example. (a) Intersubband absorption and (b) gain spectra. (c) Spatial distribution of the zone-center superlattice states. See [1] for more details.





(a) Band structures of five unintentionally doped InAs/InAs$_{1-x}$Sb$_x$ were utilized to experimentally analyze the effect of layer thickness and alloy composition on carrier lifetime in the mid-wave infrared [3]. (b) Comparison between measured and predicted bandgap energies of InAs/GaSb superlattices (SLs). (c) Measured (dashed line) and predicted absorbance spectra with (solid line) and without (dotted line) interface terms. Data in (b) and (c) have been utilized to characterize the laser active region of InAs/GaSb SLs device [4,5].

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