

Design of GaAs-AlGaAs quantum cascade laser

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Quantum Cascade Lasers based on cascade scheme have been first demonstrated in GaInAs-AlInAs-InP and only recently in the GaAs-AlGaAs material system. Mid to far infrared wavelength range (3-20 μm) laser sources are in great demand for free space communication, chemical and trace gas sensing and medical imaging. Laser based on GaAs-AlGaAs are in their infancy, however are progressing to reach the same level of performance as the GaInAs-AlInAs-InP quantum cascade (QC) lasers at least in the 10-15 μm wavelength range.

We are going to propose a new structure for GaAs-AlGaAs quantum cascade (QC) lasers in the 10-10.5 μm wavelength range. We used a numerical technique which is used to solve the 1D time-independent Schrödinger's equation for quantum cascade laser structures; this method is numerically stable for GaAs-AlGaAs material system.