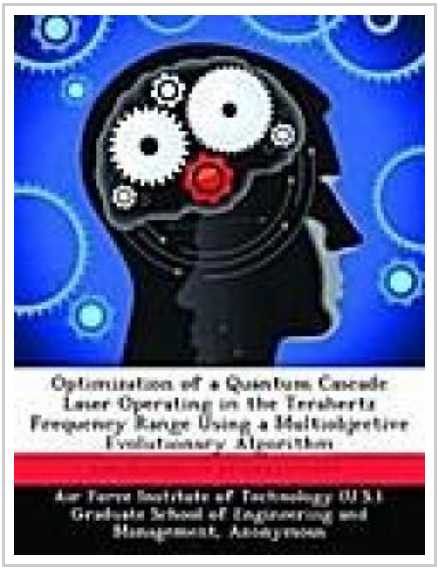


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Optimization of a Quantum Cascade Laser Operating in the Terahertz Frequency Range Using a Multiobjective Evolutionary Algorithm

By Air Force Institute of Technology (U. S.). Graduate School of Engineering and Management

Biblioscholar Sep 2012, 2012. Taschenbuch. Book Condition: Neu. 246x189x8 mm. This item is printed on demand - Print on Demand Neuware - A quantum cascade (QC) laser is a specific type of semiconductor laser that operates through principles of quantum mechanics. In less than a decade QC lasers are already able to outperform previously designed double heterostructure semiconductor lasers. Because there is a genuine lack of compact and coherent devices which can operate in the far-infrared region the motivation exists for designing a terahertz QC laser. A device operating at this frequency is expected to be more efficient and cost effective than currently existing devices. It has potential applications in the fields of spectroscopy, astronomy, medicine and free-space communication as well as applications to near-space radar and chemical/biological detection. The overarching goal of this research was to find QC laser parameter combinations which can be used to fabricate viable structures. To ensure operation in the THz region the device must conform to the extremely small energy level spacing range from 1015 meV. The time and expense of the design and production process is prohibitive, so an alternative to fabrication was necessary. To accomplish this goal a model of a QC...

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