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Physics of Quantum Cascade Raman lasers FENG XIE, ALEXEY BELYANIN, Department of Physics, Texas A&M University — The new semiconductor injection Raman laser is reviewed in this paper. It employs resonant stimulated Raman scattering in a system of electronic subbands in n-doped semiconductor (InGaAs/AlInAs or GaAs/AlGaAs) coupled quantum wells, embedded within the Quantum Cascade (QC)laser structure. The QC laser serves as an internal optical pump for the Raman process. Resonance with intersubband transitions leads to a significantly enhanced Raman gain, high conversion efficiency and low threshold. The device is driven electrically; no external optical pumping is needed. Raman laser can operate within a broad range of wavelengths by varying the energy differences between electron states in a coupled quantum well. These advantages lead to a new class of compact mid and far-infrared laser sources.

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