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Intersubband magnetophonon resonance in InAs/AlSb quantum cascade structures. GEORGY FEDOROV, National High Magnetic Field Laboratory, AARON WADE, National High Magnetic Field Laboratory, DMITRY SMIRNOV, National High Magnetic Field Laboratory, ROLAND TESSIER, CEM2, University of Montpellier II, ALEXEI BARANOV, CEM2, University of Montpellier II — Application of an external magnetic field offers a sensitive experimental tool to study and control basic processes which determine the performance of quantum cascade lasers – quantum confinement and intersubband relaxation. A strong magnetic field applied parallel to the confinement direction resonantly modulates the lifetime of the upper state of the laser transition, which is controlled by electron-optical phonon scattering. This effect of the intersubband magnetophonon resonance (ISMPR) allows for the investigation of the electronic structure and electron scattering mechanisms. We report on the observation of ISMPR in quantum cascade lasers based on InAs/AlSb heterostructures. Our experiments have been done under a magnetic field up to 33 T. We observe pronounced quantum oscillations in both the magnetoresistance and the intensity of the intersubband laser emission. Analysis of the obtained data is provided.

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