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Magneto-Inter-Subband Oscillations in GaAs quantum wells with three populated subbands placed in tilted magnetic fields.[1] WILLIAM MAYER, JESSE KANTER, SERGEY VITKALOV, City College of New York, CUNY Graduate Center, ALEXEY BYKOV, Institute of Semiconductor Physics, Novosibirsk, Russia — The effect of tilted magnetic fields on magnetotransport is studied in GaAs quantum wells with three populated subbands. In perpendicular fields magneto-intersubband oscillations (MISO) are observed. These oscillations obey the relation $\Delta_{ij} = (E_i - E_j) = k\omega_c$, where E_i is the energy of the bottom of i-th subband and k is an integer. MISO are periodic in the inverse magnetic field and show three frequencies $f_{ij} \sim \Delta_{ij}$. Due to $E_{1,2} << E_3$ two MISO oscillate at high frequencies (HF) demonstrating a beat pattern with the beat frequency $f_b = (f_{13} - f_{23})/2 \sim \Delta_{12}$. With increasing tilt angle at small magnetic fields, $\omega_c < \Delta_{12}$, the periodicity of HF-MISO changes indicating a change in the subband gap Δ_{12}. The dependence of Δ_{12} on the parallel magnetic field is found to be in a good agreement with existing theory. At larger parallel magnetic fields and $\omega_c > \Delta_{12}$, the high frequency beating disappears leaving only HF-MISO with single frequency $f = (f_{13} + f_{23})/2$. It indicates a magnetic breakdown between the lower two subbands. Investigations of the 2D electron system in the regime of the magnetic breakdown are presented.

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