25
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Abstract:We discuss a possible mechanism of the current instability in multi-gated structures with periodic modulation of the electron density in the device channel. In such structures, the plasma wave velocity is periodically modulated as well, and the stationary electric current may become unstable with respect to generation of the plasma oscillations. In the simplest model of periodically alternating stripes of the electron density with plasma wave velocities s <inf>a</inf> and s<inf>b</inf>, respectively (s<inf>a</inf> < s<inf>b</inf>), the instability occurs when the electron drift velocity approaches s <inf>a</inf>. For typical parameters, the plasma oscillation frequency can be tuned to be in the terahertz range of frequencies. © 2012 American Institute of Physics.
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