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Title:Terahertz emission induced by optical beating in nanometer-length field-effect transistors

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Abstract: We report on photo-induced terahertz radiation with a high spectral purity generated by a submicron sized InGaAs-based high-electron-mobility transistor. The emission peak is due to the electron-hole pairs photocreated in the transistor channel at the frequency of the beating of two cw-laser sources. The radiation frequency corresponds to the lowest fundamental plasma mode in the gated region of the transistor channel. The observed high emission quality factor at 200K is interpreted as a result of stream-plasma instability in the two-dimensional electron gas whose appearance is emphasized by the reduction of the velocity relaxation rate with the temperature. (C) 2012 American Institute of Physics. [<http://dx.doi.org/10.1063/1.4718445>]

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