Quantum Enhanced Josephson Junction Field-Effect Transistors for Logic Applications

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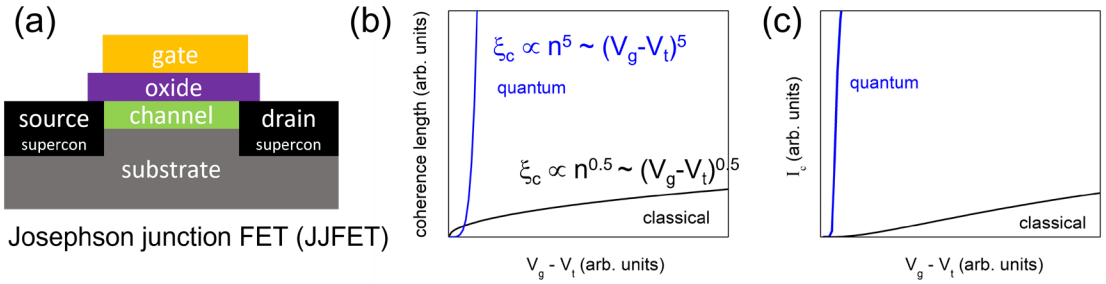

Fig. 1: (a) Schematic of a Josephson junction field-effect transistor (JJFET). The source and drain electrodes are made of superconducting material tantalum. (b) Schematic gate bias dependence of coherence length in a conventional classical JJFET and in a quantum enhanced JJFET. (c) Gate bias dependence of superconducting critical current calculated for classical and quantum JJFETs.

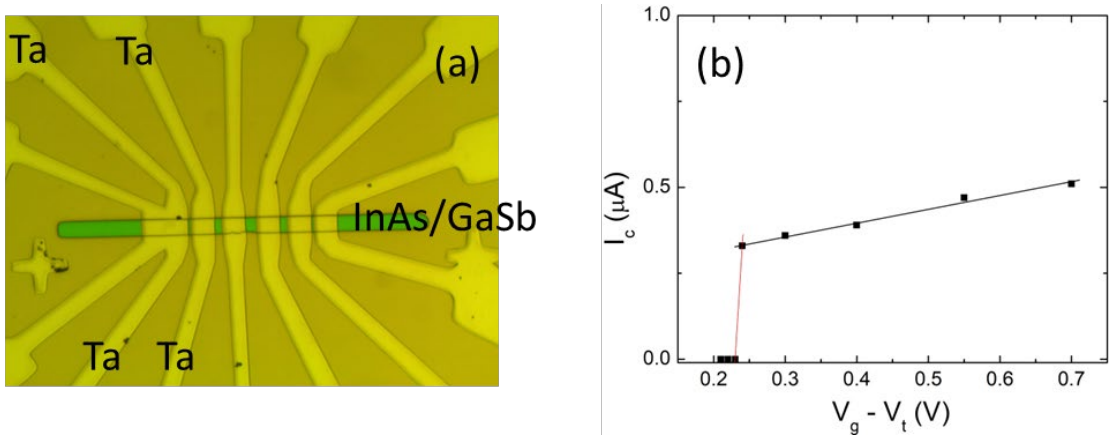

Fig. 2: (a) Optical image of a JJEFT device. The green-colored bar represents the InAs/GaSb heterostructures. Superconducting Ta electrodes are marked for the Josephson junction studied. (b) Critical current I_c versus V_g-V_t. Lines are linear fits. The slope of the red line is dI_c/dV_g = 33 μA/V.