Supercurrents in niobium-InSb nanowire Josephson junctions

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We will present preliminary results on the measurement of the supercurrent in Josephson junctions formed from InSb nanowires contacted with niobium source/drain leads. Our work is motivated by recent proposals for the realization of Majorana Fermions (MFs) in 1-D systems with strong spin-orbit interaction coupled to *s*-wave superconductors[1,2] and encouraging experimental results which hint at the detection of MFs[3-6]. We fabricate devices using both niobium deposited by electron beam evaporation and DC magnetron sputtering. Our devices show the signature of gate tunable switching current which persists to high magnetic fields (up to 3T). We are able to measure the ac-Josephson effect in this magnetic field range and observe the Shapiro step pattern. In addition we observe suppression and recovery of the switching current with increasing magnetic field indicating the influence of the Zeeman effect.

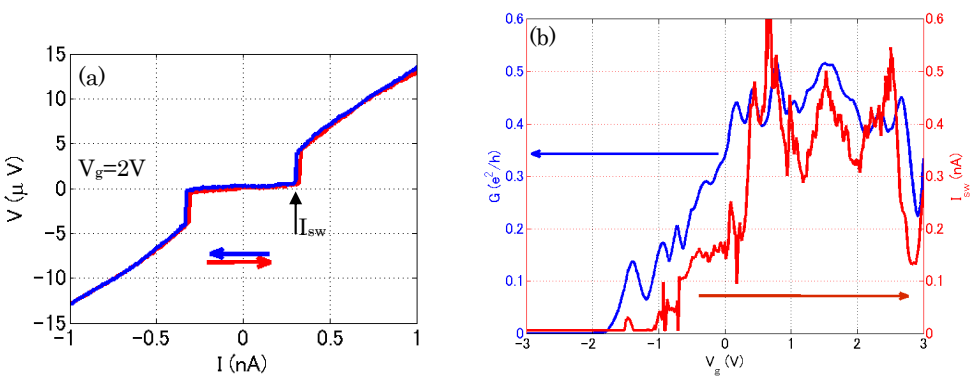

Figure (a) Example V-I trace showing the switching of the junction between supercurrent and normal branches. (b) Switching currents (red) and differential conductance (blue) measured as a function of the gate voltage.

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