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Dynamics of Bloch oscillating transistor near bifurcation threshold and its applicability for common mode rejection capability of a differential pair BOT JAYANTA SARKAR, ANTTI PUSKA, O.V.Lounasmaa Laboratory, LTL, Aalto University, Finland, JUHA HASSEL, VTT Technical Research Centre of Finland, Finland, PERTTI HAKONEN, O.V.Lounasmaa Laboratory, LTL, Aalto University, Finland — Bloch oscillating transistor (BOT) is mesoscopic current amplier based on a combination of a Josephson junction or a squid connected with a large resistor and a NIS junction. We have studied the dynamics of BOT near the bifurcation threshold [1]. This is an important feature for an amplifier as this can be utilized to improve its performance characteristics. We have measured the $I-V$ characteristics of the BOT with different base currents (I_B) over a wide range of Josephson coupling energies (E_J). The current gain (β) is found to be increasing with increasing I_B and eventually diverging. We have found a record large $\beta = 50$ in our experiment. In order to determine the common mode rejection ratio (CMRR) of a differential pair BOT we have used two BOTs fabricated on the same chip [2]. The common mode port is connected to the bases of the two BOTs and fed with varying voltages; simultaneously emitter currents of the two BOTs are recorded. In our experiment we found a 20dB of CMRR. [1] Sarkar et. al., Phys. Rev. B, **87**, 224514 (2013) [2] Sarkar et.al., Supercond. Sci. Technol., **26**, 065009 (2013)

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