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**Low Frequency Noise in Carbon Nanotube Field Effect Transistors**[1] FEI LIU, UCLA, KANG L. WANG, DAIHUA ZHANG, USC, CHONGWU ZHOU, UCLA TEAM, USC TEAM — It is critical to understand the noise performance of the carbon nanotube field effect transistors (CNT-FETs) due to their ultra-small diameters and large surface to volume ratios. In the abstract, we will describe the noise study of an ambipolar CNT-FET with a negative threshold of 5V and a positive threshold of 15V. The noise power spectra densities (PSDs) are obtained for frequencies from 0.0625Hz to 10.24kHz, showing $1/f^{\alpha}$ behavior. The exponential $\alpha$ of this $1/f^{\alpha}$ increases from about 0.6 to 1.2 for a gate bias from -6V to -15V at a small source-drain bias (-0.1V) and this exponential gate bias dependence comes from schottky contacts, where shot noise is the dominant noise component. We also observe a greater excess 1/f noise for electron conducting than that for hole conducting, suggesting higher defect density near the CNT conduction band. The characteristics of the CNT-FET noise are different from conventional MOSFET, and thus, additional studies are needed to understanding the noise in CNT-FETs.

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