

Traditional Si MOS Devices Working at Cryogenic Temperatures for Novel Applications

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Novel cryogenic applications, such as quantum computing and high-performance computing, have recently attracted great attention. The Si MOS devices, such as Si MOS qubits and CMOS, have been considered as the key components in the applications.

In this talk, Kao will show you their recent results of the measured cryogenic characteristics of MOSFETs, inverters and ferrodevices. In the theoretical part, he will explain the reason why you may not want to use too-advanced CMOS technology nodes in the cryogenic applications, how they use first-principle calculation to estimate the band tails at Si/oxide interfaces, how surface roughness impacts the valley splitting of Si MOS qubits, how they train a neural-network model predicting physical quantities in two-dimensional landscapes for explainable predictions.