CONDENSED MATTER COLLOQUIUM SERIES

#Ankara

Alp Sipahigil

University of California, Berkeley

Next-generation superconducting qubits via defect and phonon engineering

December, 17
Tuesday

19:00, (Ankara Time)

Click here for zoom link
Meeting ID: 432 931 6595
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Fault-tolerant quantum computation requires further advances in lowering physical qubit rates in scalable architectures. In this talk, I will present our work on quantum device physics to enable lower error rates in superconducting quantum processors. I will discuss how defects [1] and interfaces [2] in silicon limit superconducting qubit performance. I will present our discovery of interface piezoelectricity at a superconductor-silicon junction and the impact of this effect on superconducting qubits. I will conclude by discussing our approach using phononics to suppress these loss channels [3].

[1] Z Zhang*, K Godeneli*, et al., arXiv: 2402.17155 (2024)
[2] H. Zhou et al., arXiv: 2409.10626 (2024)
[3] M Odeh et al., arXiv: 2312.01031 (2023)

Alp Sipahigil is the Ping & Amy Chao Family Assistant Professor of Electrical Engineering and Computer Sciences at the University of California, Berkeley. He has joint appointments as a Faculty Scientist at the Materials Sciences Division at Lawrence Berkeley National Laboratory and a supporting appointment at UC Berkeley Physics. He leads the Berkeley Quantum Devices Group which focuses on solid-state device research to advance quantum computation, communication and sensing. His group studies a wide range of physical systems including superconducting quantum circuits, color centers, integrated photonics and phononics. Prior to joining Berkeley in 2021, he was an Institute for Quantum Information and Matter postdoctoral scholar at Caltech. He received his Ph.D. in Physics from Harvard University in 2017 and his B.S. degrees in Physics and Electrical Engineering from Bogazici University in 2010.

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