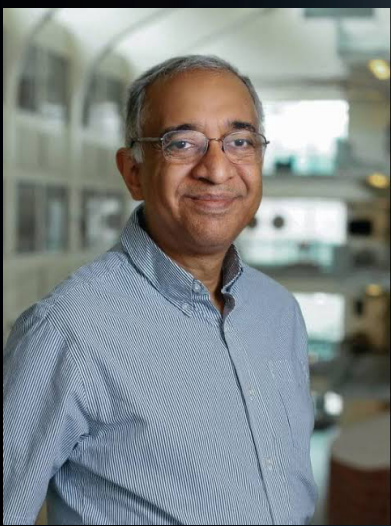


Are There Bounds on the Superconducting Transition Temperature?

The question of understanding limits on the superconducting transition temperature T_c is of great fundamental and technological importance. I will give a pedagogical introduction to this question aimed at non-specialists. I will describe recent progress on deriving exact upper bounds on the T_c of 2D superconductors applicable to a wide range of quantum materials and to ultracold atomic gases. I will illustrate the usefulness of these bounds by making contact with recent experiments on a variety of systems where standard BCS theory fails. Next, motivated by twisted bilayer graphene, I will show how our bounds need to be generalized when the band structure exhibits non-trivial topology or lacks dispersion, i.e., flat band superconductivity. I will conclude by discussing why the question of obtaining general upper bounds on T_c in 3D remains an open challenge.



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Mohit Randeria is Professor of Physics at The Ohio State University and currently an Infosys Visiting Chair Professor at IISc Bengaluru. His research focuses on correlated and topological quantum materials and condensed matter theory. He obtained a BTech in electrical engineering from IIT Delhi, MS from Caltech, and PhD in theoretical physics from Cornell. After post-doctoral research at the University of Illinois at

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3:30 PM, 19 March 2024

Zoom link: <https://shorturl.at/nwxJS>

Meeting ID: 958 1413 1856

Passcode: 191920

Madhava Lecture Hall
ICTS, Bengaluru