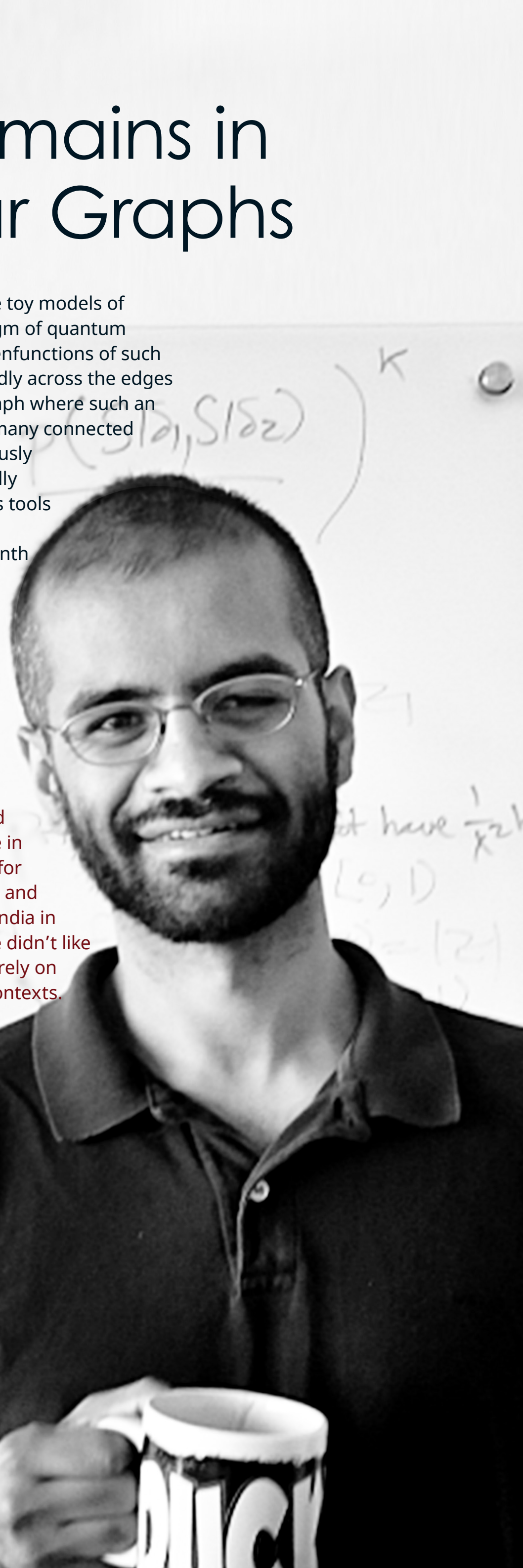
ICTS SPECIAL COLLOQUIUM

Many Nodal Domains in Random Regular Graphs

Sparse random regular graphs have been proposed as discrete toy models of physical systems with *"chaotic"* classical dynamics. The paradigm of quantum chaos predicts heuristically that the high energy Laplacian eigenfunctions of such graphs should behave like *"random waves"* which oscillate rapidly across the edges of the graph — in particular, deleting all of the edges of the graph where such an eigenfunction changes sign should disconnect the graph into many connected components (which are known as "nodal domains"). We rigorously prove this for eigenfunctions of sufficiently high energy, partially confirming a conjecture made by physicists. The proof employs tools from random matrix theory, graph limits, and combinatorics.
Joint work with Shirshendu Ganguly, Theo McKenzie, and Sidhanth Mohanty.

NIKHIL SRIVASTAVA

is an associate professor of mathematics at UC Berkeley. He double-majored in Mathematics and Computer Science and minored in English at Union College, advised by Alan Taylor and Peter Heinegg. He received his PhD in computer science at Yale in 2010, advised by Dan Spielman. After postdocs at the Institute for Advanced Study, the Mathematical Sciences Research Institute, and Princeton University, Srivastava moved to Microsoft Research India in 2012, where he stayed until 2014 before coming to Berkeley. He didn't like linear algebra as an undergraduate but now works almost entirely on problems related to eigenvalues and eigenvectors in various contexts.



4:30 pm, 21 December 2021

ONLINE COLLOQUIUM
Zoom link - https://bit.ly/ictsSPCdec21

Meeting ID : 822 5908 9188
Passcode : 595958

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