



Weekly Seminar

Anyon dynamics in fractional quantum Hall systems and their experimental implications

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Time: 3:00pm, May. 18, 2022 (Wednesday)

时间: 2022年5月18日 (周三) 下午3:00

腾讯会议链接: <https://meeting.tencent.com/dm/XFQrMaEYJMm1>

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Abstract

Anyons are topological objects with fractionalised charge and exotic statistics that can emerge from two-dimensional strongly correlated systems. We show that with fractional quantum Hall (FQH) effect, there are rich dynamics of anyons hosted by even the simplest topological phases. The analytic tools we developed, combined with large scale numerical calculations, show that anyons can undergo fractionalisation near the critical point between the nematic FQH state and the fully gapped FQH state. This leads to a BKT-type phase transition for the low-lying excitations of the Laughlin phase, even when the topological properties of the ground state remain the same. In addition, we show that anyons in FQH systems can be bosonized, and the microscopic interaction Hamiltonians capturing the statistical interactions between anyons can be explicitly derived. The duality from this bosonization scheme leads to previously unexplored families bosonic single-component FQH states at integer filling factors, with explicit microscopic model Hamiltonians. We will also discuss several experimental ramifications from our results.

About the speaker

Yang Bo joined the faculty at Nanyang Technological University as a Nanyang assistant professor and a National Research Foundation Fellow in 2018. Previously he was a research scientist at Institute of High Performance Computing, A*STAR of Singapore. He received his BS degree in Physics and Mathematics from Stanford University, and PhD in Physics from Princeton University. Yang Bo's main research interests include fractional quantum Hall effect and strongly correlated topological systems, classical complex systems and traffic theory. (<https://sites.google.com/view/yang-bo/>).