QuanTalks

IISc Quantum Technologies Initiative (IQTI) Seminar Series

Title

Continuous-variable quantum computing: resources and applications

Speaker

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Date & Time

Wednesday, 23rd February 2022, 6:30 PM IST

Meeting Link

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Abstract: Continuous-Variable (CV) quantum computing is a promising alternative approach to quantum computation with respect to the use of two-level systems. It yields the possibility to generate deterministically large entangled states, and to preserve quantum information through the use of bosonic codes. In this approach, typical observables have a continuous spectrum, such as for instance the real and imaginary quadratures of the quantised electromagnetic field. I will present an introduction to this field, and then dwell on some of our current research questions: how to engineer the tools required for universal quantum computation in CV? How to distinguish a CV quantum computing architecture capable of providing computational speed-up from one which is not? What can the CV approach tell us on the resourcefulness of qubit-based quantum computers?

About the Speaker: Giulia Ferrini is Associate Professor at the department of Microtechnology and Nanoscience (MC2) and a PI at the Wallenberg Centre for Quantum Technologies (www.wacqt.se). She obtained her PhD from the University of Grenoble (France) in 2011, with a thesis on "Macroscopic quantum coherent phenomena in Bose-Josephson junctions". Before joining Chalmers, she spent 3 years in Laboratoire Kastler Brossel, Paris, where she studied applications to quantum information of multimode quantum optics experiments (2011-2014); one year in University Paris-Diderot (2015), and two years in University of Mainz, where she was recipient of a Marie Sklodowska Curie Individual Fellowship, with the goal of defining sub-universal models of quantum computation in continuous variables (2016-2017). At Chalmers and in WACQT she leads the research activity on theoretical quantum information with continuous variables and teaches Quantum Computing.