**On quantum computing, error correction, and bosonic quantum codes**

Abstract:

Quantum computing is today the most promising frontier of quantum technologies, with humongous resources and efforts being invested by countries, corporates, and venture capitals. It is also the most "transversal" among mankind's technological developments, whereby industrial R&D runs side by side with fundamental research. In this talk I will provide a brief introduction to quantum computing, with the goal of highlighting what can and what can't be achieved with this technology. I will focus on the notion of errors and discuss how they can be overcome with quantum error correction techniques, or alternatively, how they can be tolerated with appropriate hybrid quantum-classical algorithms and near-term quantum processors. In the very last part of my talk, I will briefly present our latest results on bosonic quantum codes and their possible contribution to enhance quantum error correction in future quantum hardware platforms.