



University of Crete
Department of Physics

Physics Colloquium

Thursday, 10 March 2022 | 17:00 – 18:00, Online with ZOOM

Symmetry in Quantum Information: From protocols to foundations

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ABSTRACT

Information is physical! Be it classical or quantum information transmission, storage, processing, and retrieval is done by devices obeying physical principles subject to restrictions that arise, for example, by conservation laws. As such, it is imperative to understand the limitations such restrictions impose to information processing. This colloquium addresses the restrictions to quantum information processing as a result of symmetry. After a brief tour de force on the fundamentals of symmetry in quantum theory, I outline a series of problems in quantum information where symmetry can be a hindrance and/or a blessing. I will demonstrate how one can exploit symmetry to construct realistic codes for transmitting both classical and quantum information down noisy channels, protocols for compressing and copying quantum circuits, as well as metrological schemes for imaging and time-keeping that operate at the quantum mechanical limit. More profoundly, I hope to convince you that symmetry, and symmetry alone, is enough to explain the absence of macroscopic quantum phenomena from our everyday experience.

ZOOM Link: <https://zoom.us/j/98901161343?pwd=T2dDVU5TcjY2RnJnbIVPZzg2bjYwZz09>