Contribution ID: **4** Type: **not specified**

Recovery of qubit state after noisy leakage in high-dimensional space

Thursday, February 1, 2024 11:10 AM (50 minutes)

Experiments often encode qubit states in physical systems that have many more physical dimensions. Unfortunately, environmental noise can cause the logical qubit to leak into these dimensions, compromising the qubit nature of the state. This causes unwanted artefacts, such as increased entropies. I will describe a new mathematical method to recover a meaningful qubit state from a known noisy high-dimensional state [1]. This method is valid for many physical situations where noise acts separately on two subspaces. As an example, we apply the method to the tomographically obtained states of a microwave cavity, which was used in a Maxwell demon experiment [2]. We find excellent recovery of the encoded state and a massive reduction in entropy. The new recovery method paves the way for quantum experiments and technologies to extract meaningful qubit information from a jungle of noise.

[1] J. Anders, S. Sevitz, et al, in preparation.
[2] N. Cottet, et al., "Observing a quantum Maxwell demon at work", PNAS 114, 7561 (2017).

Presenter: ANDERS, Janet (University of Exeter)