Contribution ID: **87** Type: **Oral**

Noisy quantum metrology enhanced by continuous nondemolition measurement

Monday, 28 September 2020 15:15 (8 minutes)

In this work, we show that, by exploiting continuous quantum nondemolition measurement, it is possible to preserve quantum advantage in a frequency estimation (or magnetometry) measurement scheme even in the presence of independent dephasing noise, usually the most detrimental type of noise. We thus verify that such enhancement is preserved thanks to non-classical correlations, namely spin squeezing, which are dynamically generated by the measurement itself. Remarkably, our scheme does not require the preparation of any entangled, or non-classically correlated state of the probe: the probe is initialized in a classical coherent spin state and the resources required for the quantum enhancement are dynamically created during the conditional evolution. We moreover provide evidence that our results are robust and hold true in a wide range of noise intensities and even in the presence of inefficient measuring devices.

Presenter: ROSSI, Matteo (University of Turku)

Session Classification: Contributed