

Experimental Quantum Reading

G ORTOLANO^{1,2}

¹ *Quantum metrology and nano technologies, Istituto Nazionale di Ricerca Metrologica, 91, Strada delle Cacce, Turin, Italy*

² *DISAT, Politecnico di Torino, 24, Corso Duca degli Abruzzi, Turin, Italy*
Contact Email: giuseppe.ortolano@polito.it

The final goal of quantum sensing is to reach advantage over classical schemes using quantum resources. In the protocol of quantum reading, this advantage is obtained for the task of information recovery from a classical digital memory. In the work presented we showed, both theoretically and experimentally, how this advantage can be achieved using an entangled two-mode squeezed vacuum source paired with a photon-counting measurement and a maximum likelihood decision. Our proposed scheme is able to outperform any classical strategy for the same number of input photons. Our experimental results prove how quantum entanglement and simple optics are able to enhance the redout of digital data, paving the way to the real application of quantum reading as well as any other model based on the binary discrimination of bosonic loss.