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Quantifying Nonclassicality via the Precision in Quantum Metrology WENCHAO GE, Institute for Quantum Science and Engineering (IQSE) and Department of Physics and Astronomy, Texas AM University, College Station, TX 77843-4242, US, KURT JACOBS, United States Army Research Laboratory, Adelphi, Maryland 20783, USA, SAEED ASIRI, The National Center for Laser and Optoelectronics Technologies, KACST, Riyadh 11442, Saudi Arabia, MICHAEL FOSS-FEIG, United States Army Research Laboratory, Adelphi, Maryland 20783, USA, SUHAIL ZUBAIRY, Institute for Quantum Science and Engineering (IQSE) and Department of Physics and Astronomy, Texas AM University, College Station, TX 77843-4242, US — The nonclassical properties of quantum states are of tremendous interest due to their potential applications in future technologies. It has recently been realized that the concept of a resource theory is a powerful approach to quantifying and understanding nonclassicality. An important goal in this endeavor is to find resource theoretic measures of nonclassicality that are operational, meaning that they also quantify the ability of quantum states to provide enhanced performance for specific tasks, such as precision sensing. In this talk, I will present an operational resource theoretic measure that makes a strong connection between nonclassicality and metrological power. I will also show that a balanced Mach-Zehnder Interferometer provides a way to experimentally extract this measure.

Wenchao Ge
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