Contribution ID: **9** Type: **Poster**

Bright Squeezed Light Generation and Quantum Correlation Measurements

Tuesday, 23 May 2023 18:12 (1 minute)

State-of-the-art, high-precision metrology experiments like gravitational wave detectors require carefully stabilized laser sources with exceptionally low relative power noise (RPN). The RPN is fundamentally quantum noise limited by the relative shot noise (RSN) for classical states of light. As the RSN scales inversely with the square root of the optical power, it can be reduced by increasing the power, i.e., making the laser "brighter". However, this poses various technical challenges and cannot be scaled indefinitely. Thus, additionally "squeezed" states of light can be applied to reduce the RPN below the classical quantum noise limit. This project investigates methods to generate high-power, sub-relative-shot-noise (or "bright squeezed") light. Also, the quantum correlation measurement technique is investigated as an alternative to traditional power noise sensing by correlating two photodetector signals. As presented, this method is capable of sub-shot noise measurements and could serve as a bright squeezing sensor.

Primary author: VENNEBERG, Jasper (Albert Einstein Institute / Max Planck Institute for Gravitational Physics Hannover)

Co-authors: Prof. WILLKE, Benno (Albert Einstein Institute / Max Planck Institute for Gravitational Physics Hannover); Dr VAHLBRUCH, Henning (Albert Einstein Institute / Max Planck Institute for Gravitational Physics Hannover)

Presenter: VENNEBERG, Jasper (Albert Einstein Institute / Max Planck Institute for Gravitational Physics Hannover)

Session Classification: Tuesday Poster session

Track Classification: Other