

# GR22 AND AMALDI 13 CONFERENCE 2019

## 1 Development of a new Photodetector for Advanced LIGO

The quantised nature of light poses one of the most significant barriers on the improvement of LIGO's sensitivity, with squeezed states of light being part of the A+ upgrade to reduce the shot noise and radiation pressure present within the system. However, decreasing shot noise with squeezing increases the relevance of other noise sources, specifically that of the electronic noise of the main photodetector. To tackle this and allow the use of higher levels of squeezing, a new high-power and low-noise photodetector will be developed and built at Cardiff University. This work is based on a similar photodetector design that has been successfully implemented at GEO600 [1]. We expect a lowering of the noise floor by at least a factor of 4, which will increase the amount of observed squeezing.

## References

- [1] H. Grote et al. High power and ultra-low-noise photodetector for squeezed-light enhanced gravitational wave detectors. *Optics Express*, 24, 2016.