

## **Group IGR**

**Project name Interferometry with nanostructured mirrors**

**Supervisor Bryan Barr**

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**Suitability** 20 credit no 30 credit yes 40 credit yes

**Suitable for “theoretical physics”** no

**Project description** (length should not exceed remainder of page)

Interferometric gravitational wave detectors such as GEO600 and Advanced LIGO can measure kilometer scale lengths to an accuracy of a fraction of a proton diameter. In order to achieve these outstanding sensitivities, such instruments make use of ultra-low noise mirrors. However, Brownian noise within the mirror coatings can still limit the interferometer performance. A new type of mirrors with nano structured surfaces - so-called 'waveguide mirrors' - have been suggested as alternatives to further lower the noise of mirrors for laser interferometers.

In this project the student(s) will carry out measurements to characterise the optical properties of such a waveguide mirror. Depending on the length of the project the noise characteristics and the interferometric performance will be evaluated experimentally and compared to simulations.