Contribution ID: **88** Type: **poster**

# A new experimental set-up for scattering studies of mirror coatings

*Thursday, 20 May 2021 16:18 (1 minute)*

Gravitational wave detectors impose extremely stringent requirements for the optical and mechanical properties of their mirrors. Research in new coating material focuses on minimizing mechanical losses which directly relate to the coating thermal noise. At the same time, absorption and scattering losses need to be kept at extremely low levels, since they strongly affect the operation and sensitivity of the detectors.

Here we present a new experimental set-up that is focused on scattering studies of new coatings at 1064 nm. The set-up is designed to measure bi-directional reflectance distribution functions off of coated surfaces, with a special emphasis in distinguishing scattering from different coating defects. We hope this information combined with scattering models will allow the determination of the depth distribution of defects within the coatings. Our relatively novel approach involves the reduction of image speckle which affects scattering images by reducing the spatial coherence of our laser. Finally, the new set-up is designed to study scattering from mirrors under high power and in vacuum, with the goal of testing coatings under similar conditions to the ones found in GW detectors.

This work complements existing metrology efforts within the LVK collaboration.

**Primary authors:** Prof. KONTOS, Antonios (Bard College); KING, Bobby (Bard College)

**Presenter:** Prof. KONTOS, Antonios (Bard College)

**Session Classification:** Poster session 2

**Track Classification:** Workshops: Coating thermal noise workshop