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Stray Light issues and control in Advanced Virgo Plus

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Scattered light is one of the problems that most limits the performance of current gravitational wave detectors. Simulating stray light is still computationally complicated. Therefore, in order to estimate the amount of scattered light from the optical elements, we built at LAPP an interferometric scattermeter with which the BRDF of the desired elements is measured.

In parallel, in Virgo we are working to mitigate the identified scattered light sources. On the one hand, we conducted a complete mitigation campaign of secondary beams, i.e. ghost beams, on all Virgo subsystems. As these unwanted beams propagate, they can produce scattered light that recombines with the interferometer beam. On the other hand, we developed a control loop to actively correct the stray light on the squeezing system. This system can be reproduced and applied in other circumstances.

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