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Stray Light Measurements With an Instrumented Baffle in the Advanced Virgo Input Mode Cleaner Cavity

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In April 2021, a new instrumented baffle was installed surrounding the suspended end mirror of the Virgo's Input Mode Cleaner (IMC) cavity, as part of the phase I upgrade of the Advanced Virgo interferometer. The device is equipped with photo sensors that monitor the stray light inside the cavity. It serves as a demonstrator of the technology for the baffles that will monitor the stray light in the main arms, which will be installed during the phase II upgrade in the near future.

We will give an overview of the status of the instrumented baffle and its integration into the Virgo environment and present results on the measured scattered light distribution inside the cavity using data collected between spring 2021 and spring 2022, with Virgo in commissioning phase. The sensitivity and performance stability of the baffle is discussed and the data is compared to scattered light simulations.

These results will serve to calibrate the simulations and demonstrate the potential of instrumented baffles to detect defects in the mirrors and to improve the understanding of the scattered light inside ground-based gravitational wave experiments like Virgo.

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