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First study of scattered light in the main arms of the Einstein Telescope gravitational wave detector

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As part of the design of the Einstein Telescope (ET) gravitational wave detector, a thorough study of the scattered light and its impact in the sensitivity must be performed to ensure that is not going to compromise the experiment. We present the first estimation of the sources of scattered light inside the main arms of ET for both high- and low-frequency interferometers and propose a baffle configuration and vacuum pipes radii as a recommendation during the design phase. The estimations of noise are done using both analytic and numerical tools and the results point out that the scattered light noise can be sub-dominant at all frequencies as long as the recommendations described are followed.

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