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Stray light control upgrades for LIGO 4th Observation run

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A number of upgrades are planned to be installed for the LIGO 4th observation run, including a new optical path for the frequency dependent squeezer, 300m filter cavity and low loss Fadaray isolators. Any new components added close to the optical path may cause scattered light to propagate toward parts of the vacuum envelope and other components not isolated or less isolated from the environment (such as ground motion or vibration from surrounding equipment). Additionally to that, the allowed stray light threshold lowers as the LIGO detectors become more sensitive with every next run. Therefore, noise coupling due to scatter starts being observed in the areas, which were not causing issues during earlier observation runs. In this work, we will present a summary of stray light baffles currently being installed at LIGO Hanford and LIGO Livingston Observatories for O4 as well as methods and material used for baffles design and fabrication.

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