

Interferometer Sensing and Control

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Now revisiting the LSC scheme

Change from the AM-PM scheme to a PM-PM scheme

Motivation: AM sideband is not suitable for WFS

- In the current scheme, only f_1 , which is AM, reaches the AS port.
- Gouy phase evolution allows us to extract proper WFS signals even with AM sidebands.
- However, the residual TEM00 carrier at the AS port, which is necessary for DC readout, beats against the AM sideband and creates a large signal on the QPD.
- This will make the WFS signal offset very sensitive to the beam centering of the QPD.

According to Miyakawa-san's calculation, the PM-PM scheme can extract reasonable signals for all the DOF. These signals passed the loop noise test.

The main reason for choosing the AM-PM scheme was to use double-demodulation during the lock acquisition. However, with the use of the green-locking and a non-resonant sideband, it is likely that the lock acquisition is not a problem.

Y. Aso is now reviewing the Optickle model of the LCGT and re-checking the LSC scheme. After validating the PM-PM scheme, we will move to the ASC scheme.