Hi Mayank,

I’ve attached the data that was used to make Fig 3 a-c) of this work.

A few things are worth noting with the data:

- It has three text files, each of the form “signals\_XXXXXuW.txt” where XXXXX is the corresponding input power in micro-Watts.

- These files are made of 4 lines of data, each of these lines corresponds to the voltage output of the photodiodes (PDs) shown in Fig. 2 (they are in order -> the first line of the data file is the red PD, the second line is the blue, third = green, fourth = yellow).

- Each of these lines is made up of numerous data points. These correspond to different laser frequencies, being separated by 430 Hz. This can allow you to get the x-axis in terms of frequency, with the zero point being taken when the red signal is maximal.

- Photodiodes turn optical power into a voltage, and need to be calibrated before they can be used. This calibration can consist of seeing what the output voltage is when no optical power is applied (to find a voltage offset) and also then seeing how much the output voltage changes for a known optical input power. I’ve included another file “pd\_calibration.txt” which includes this information. To turn the data given in the files into the optical power that makes up the y-axis of the figures, first we remove the voltage offset by taking away the average of the first 1000 entries (this isn’t the most sophisticated technique, but works). Second, we multiply it by a factor that I measured in the lab. These factors are given in “pd\_calibration.txt”, each value for its respective line in the data.

Let me know if you have any questions about the data!

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Also, I’m not 100% sure about the nature of this project, but if you’re looking for an “extra credit” type addition to any report, I think I have a good idea.

Equation (2) in the paper shows how the steady state powers in the resonator behave, can you show that symmetry breaking can \_\_only\_\_ occur when the detuning delta in this equation is greater than sqrt(3)?

Hints:

Symmetry breaking would require a symmetric input, i.e. the input powers for both modes to be the same.

Symmetry breaking then requires the intracavity powers for both modes to be different.

This paper may have further clues as to how to approach this, but its worth thinking about before checking: https://arxiv.org/pdf/1811.08787.pdf.

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Again, let me know if you have any questions!

Best,

Niall