Week 6 - Week commencing 7/3/2022

**Week Outline**

Online meeting to cover error fixing in the Python code and to discuss the next step of the project. After obtaining the power received by the detector, we can now calculate the photon noise as a quadrature sum of the wave noise and shot noise. The formulas for calculating them are as follows:

Where is the frequency, found from the midpoint of the bandwidth and is the optical power calculated from last week.

Where is the bandwidth.

Following this, we can also calculate the power emitted by the hot bar with room by using the same procedure as for the room power with the addition of the Beam Filling factor:

Then, the response of the hot bar in terms of power:

Then, finally the NEP can be found:

**Tasks Outline**

* Calculate the shot noise and wave noise using the optical power obtained last week
* Use the shot and wave noise to calculate the total photon noise
* Find the power of the hot bar using the equation given previously
* Use this power to find the response of the detector in terms of the power
* Calculate the NEP

**Results**

The results was calculated using the given equations to find the NEP. KID 2 was used as it has the clearest data:

* Total Photon Noise:
* Modelled :
* Room power :
* Hot bar power :
* NEP:

The NEP can now be calculated from the previous equations, dp and the noise spectral density. The NEP for KID 2 is given:

Chart, line chart

Description automatically generated