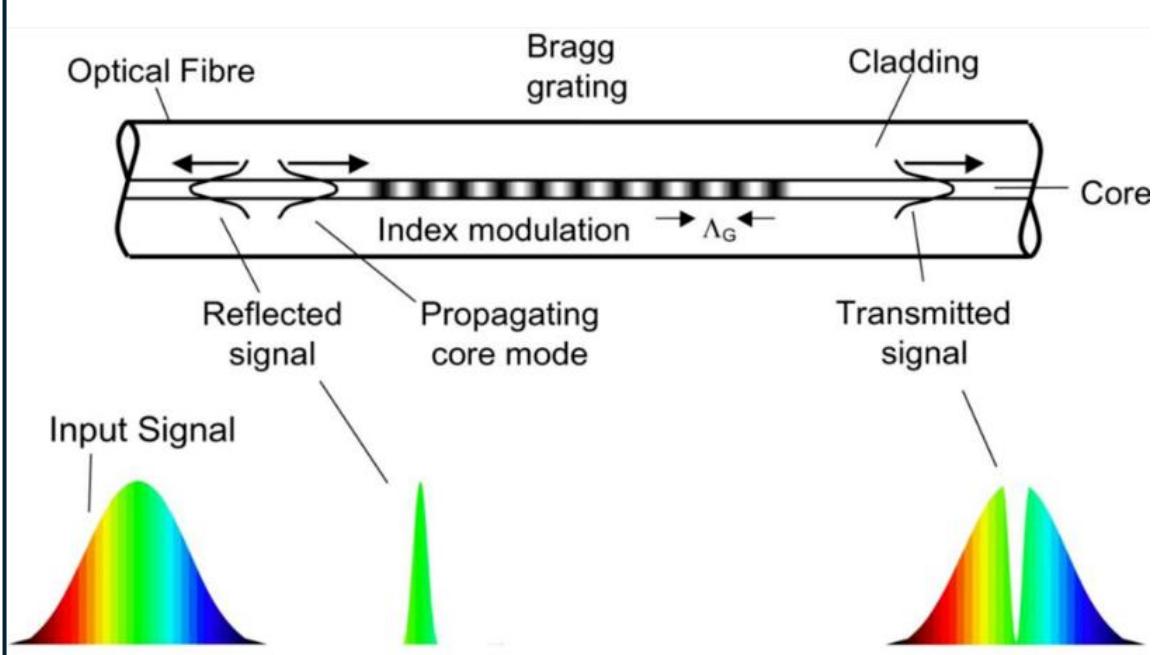


Motivation and Background

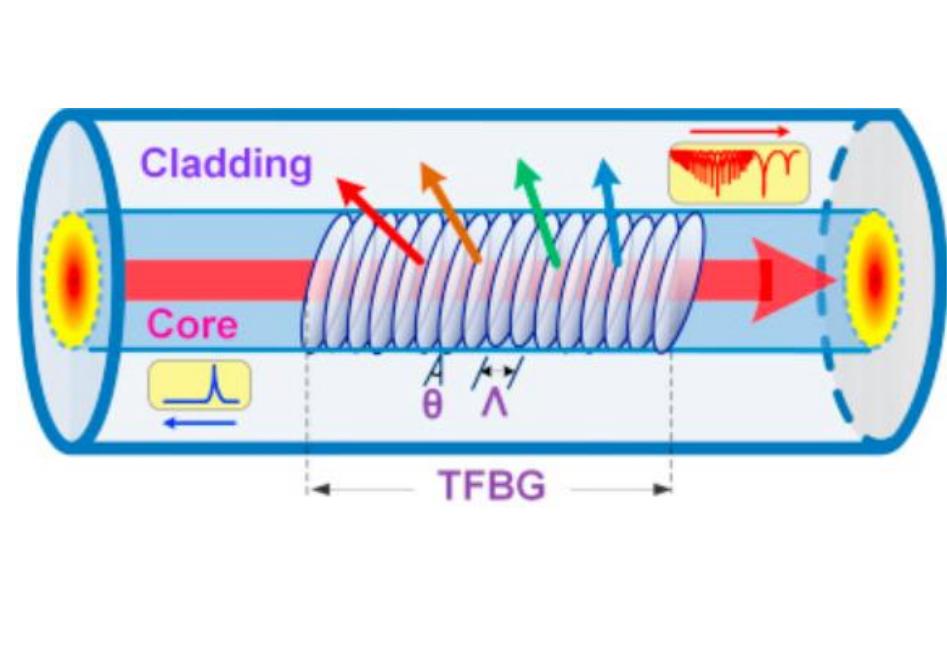
Fiber Bragg Gratings for Sensing Purposes



- FBGs offer unique sensing capabilities due to their small size, easy installation and no need for electrical supply.
- Changes in the reflected wavelength correspond to changes in temperature and strain, allowing for easy measurement of these variables in practice.

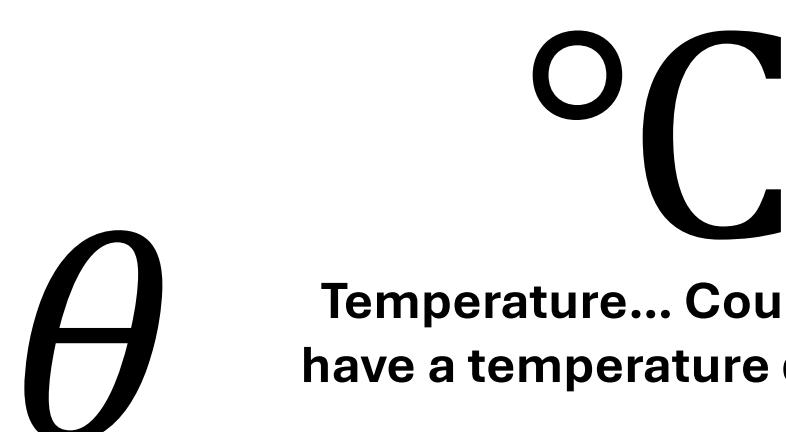
How Can We Improve Sensitivity and Consistency?

- Tilted FBGs may offer improved sensitivity due to light propagation in the cladding, hence closer to the changes in temperature.
- A cryostat chamber with a controlled temperature environment might improve consistency, reducing external effects.



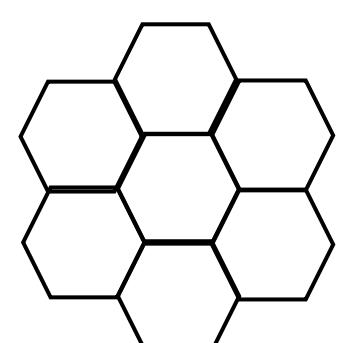
Key Questions Driving New Progress

What factors affect sensitivity, and in what way?



Temperature... Could sensitivity have a temperature dependence?

Tilted FBG Tilt Angle?

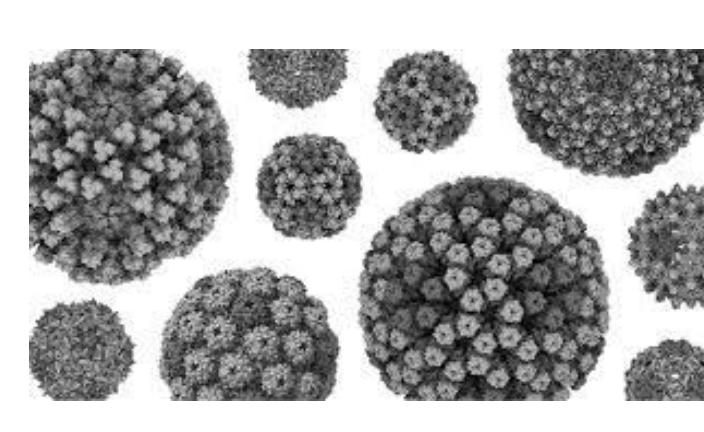


Optical Fibre Material or Coating?

What other sensing capabilities do FBGs have?



Salt Concentration?

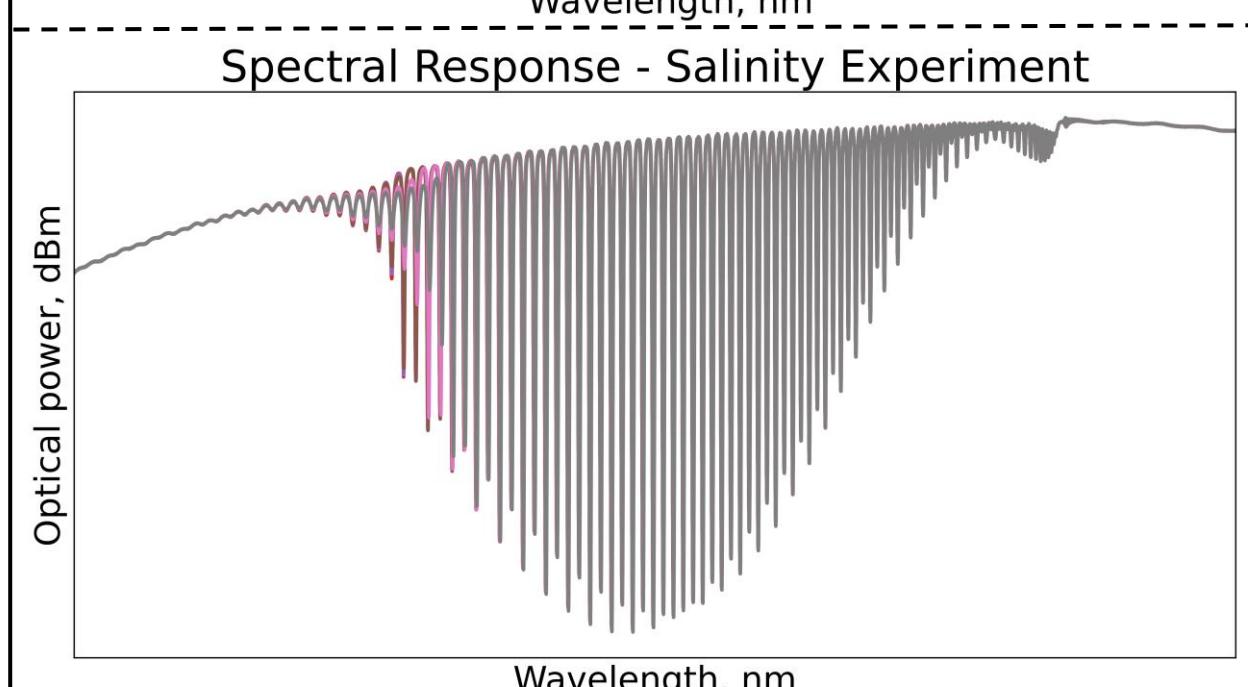
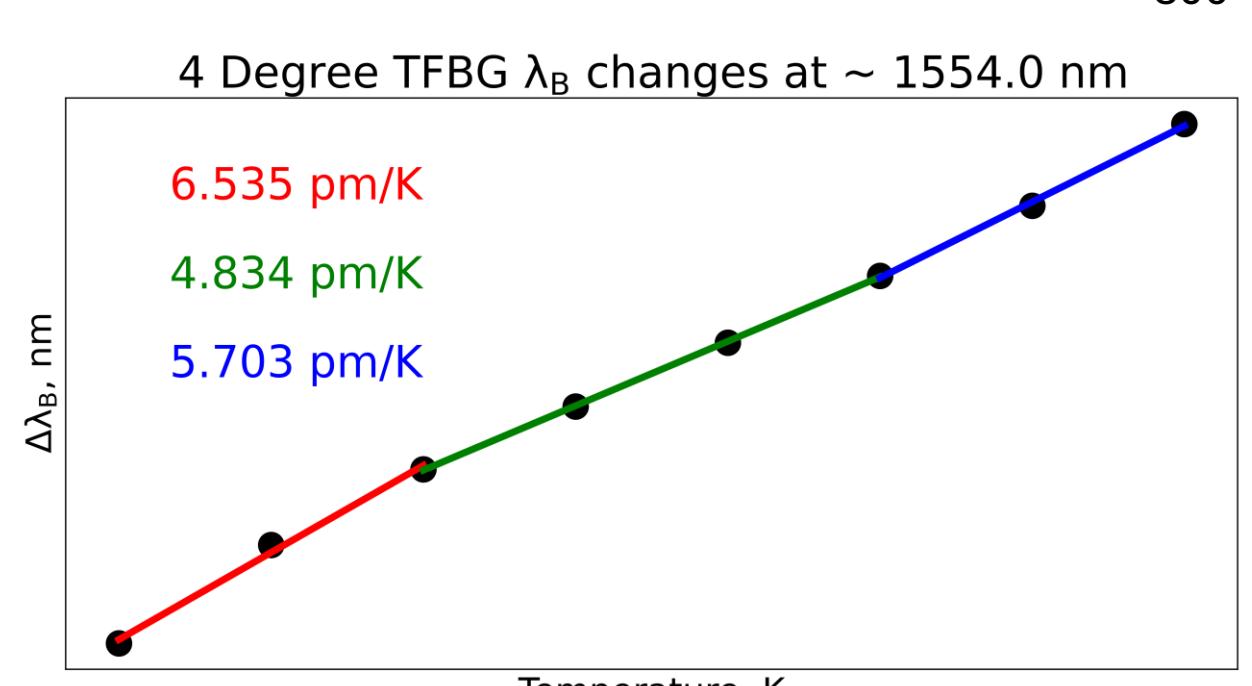
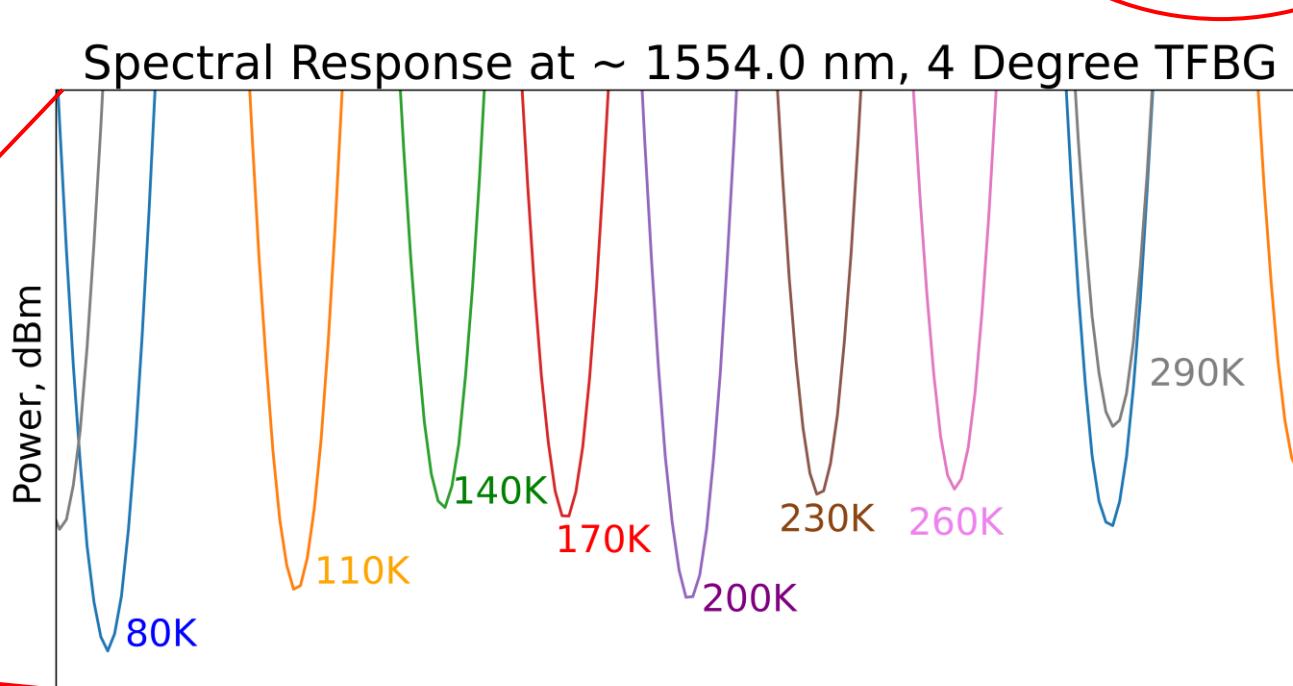
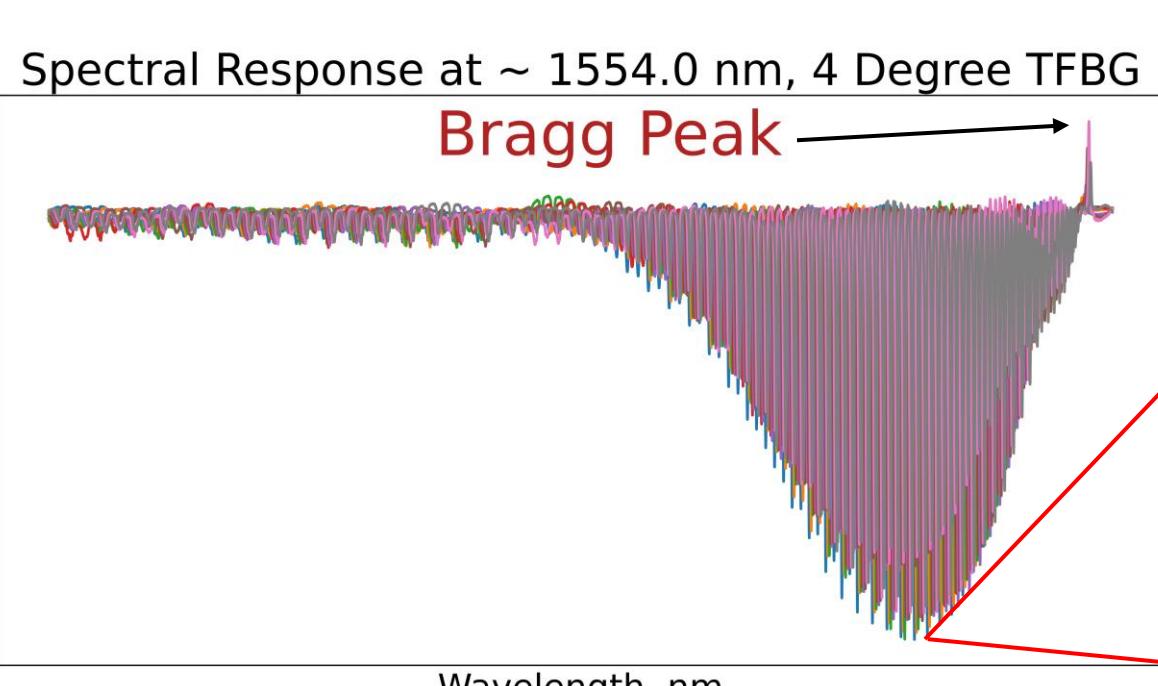
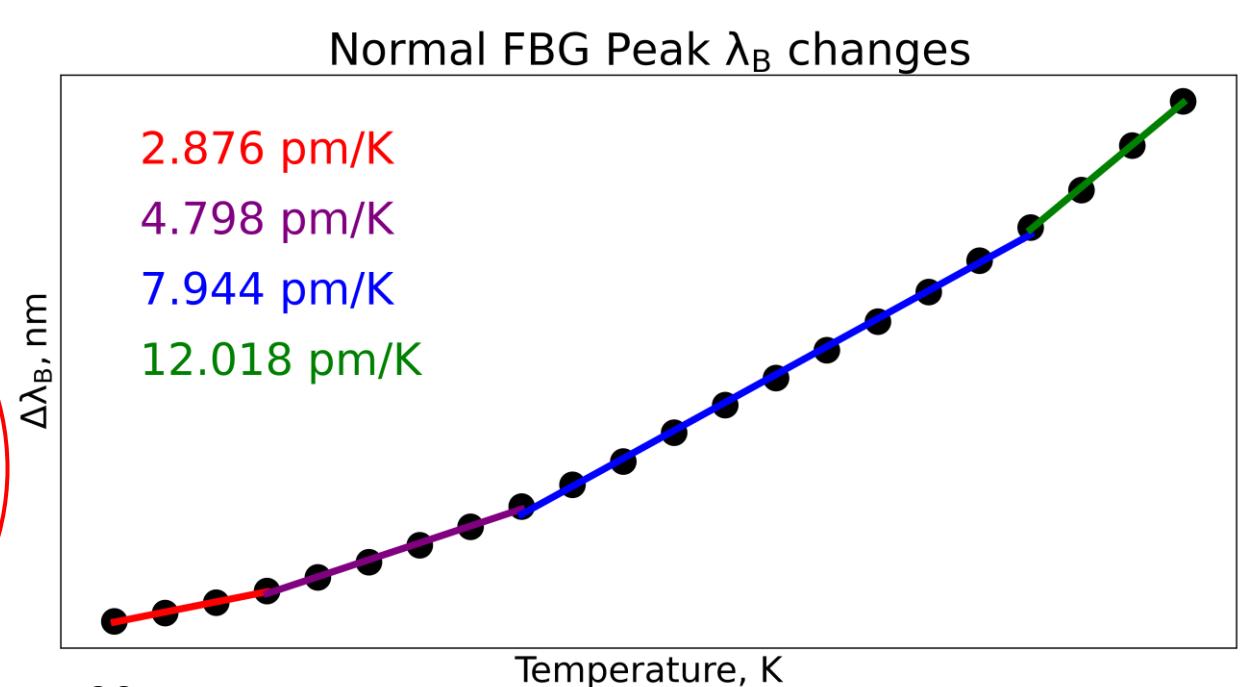
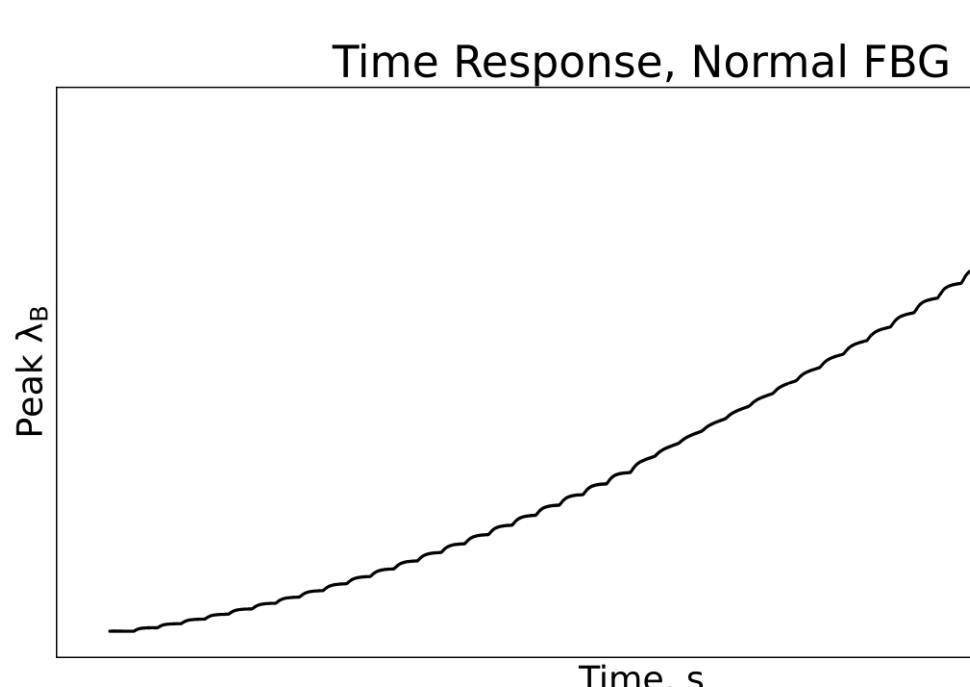
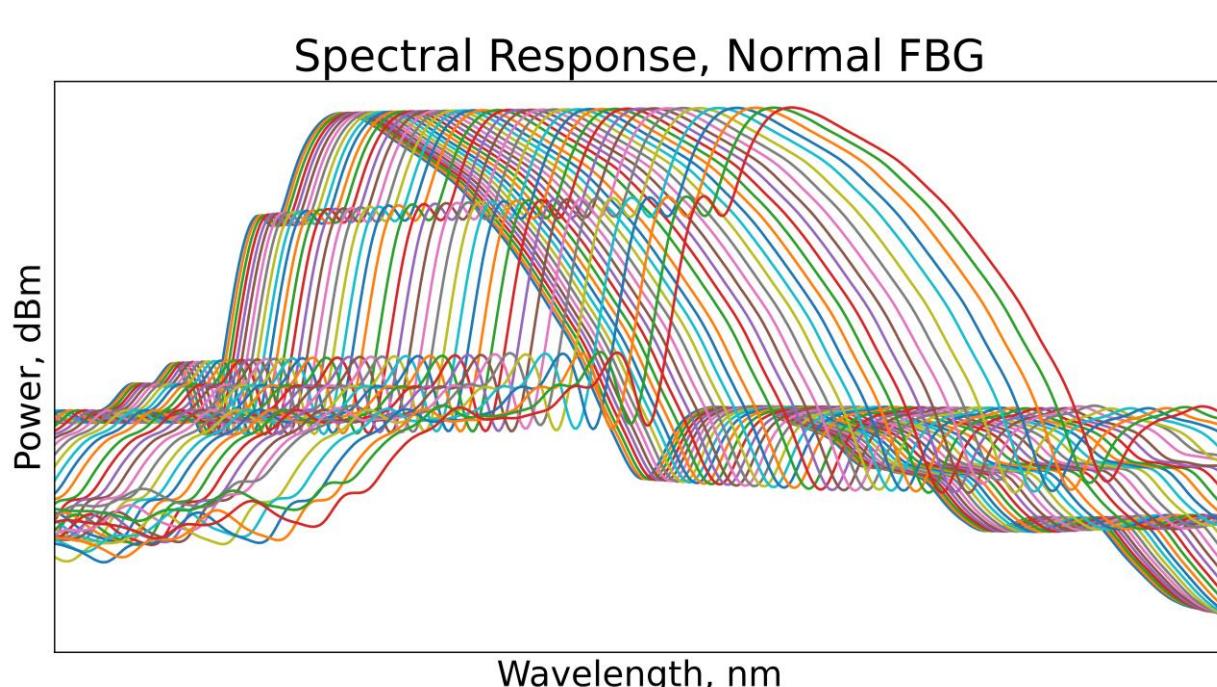


Protein/Virus Detection?

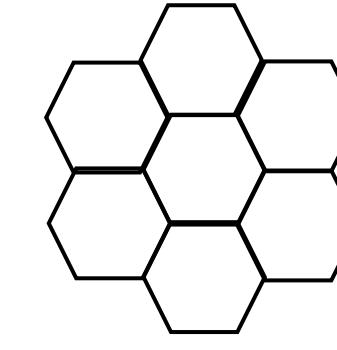
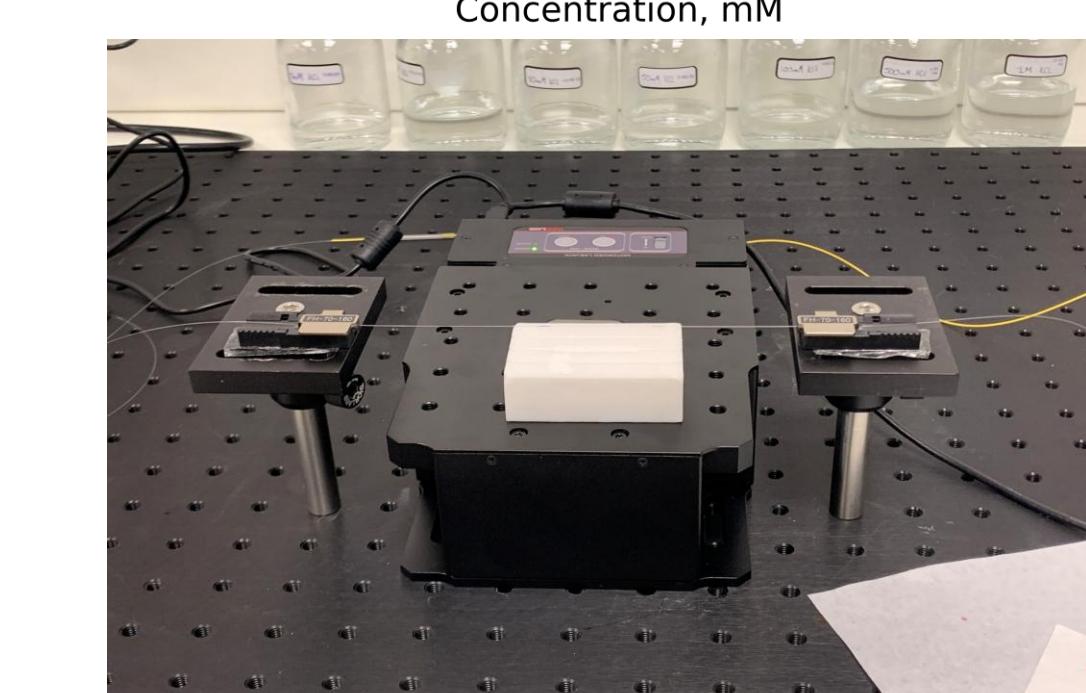
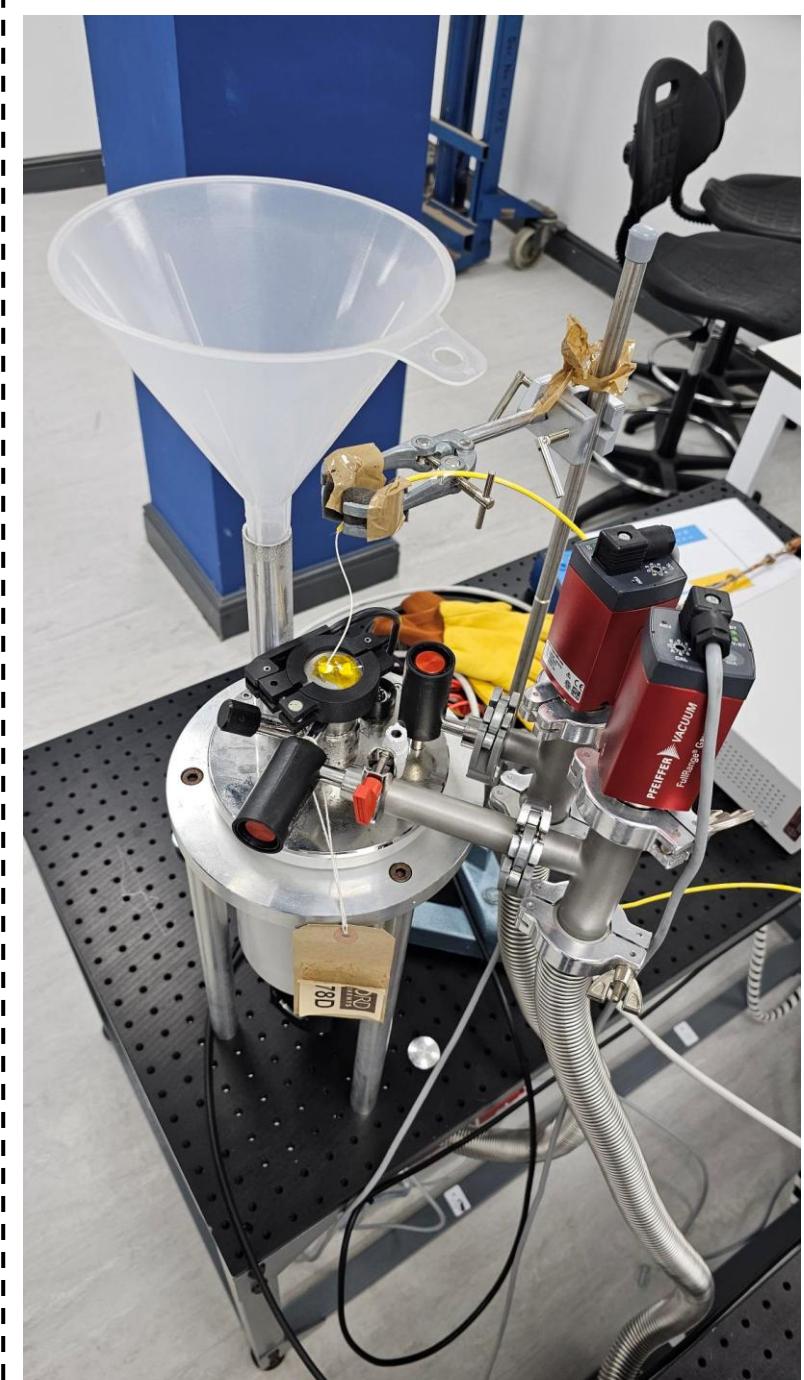
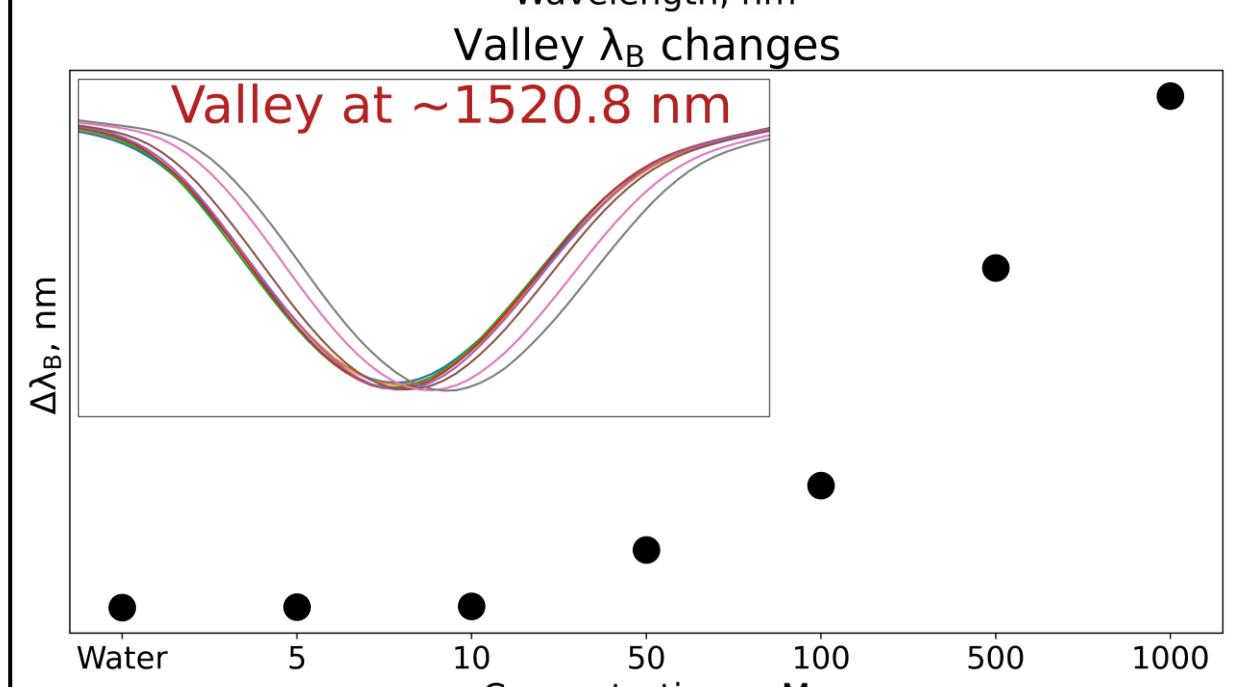
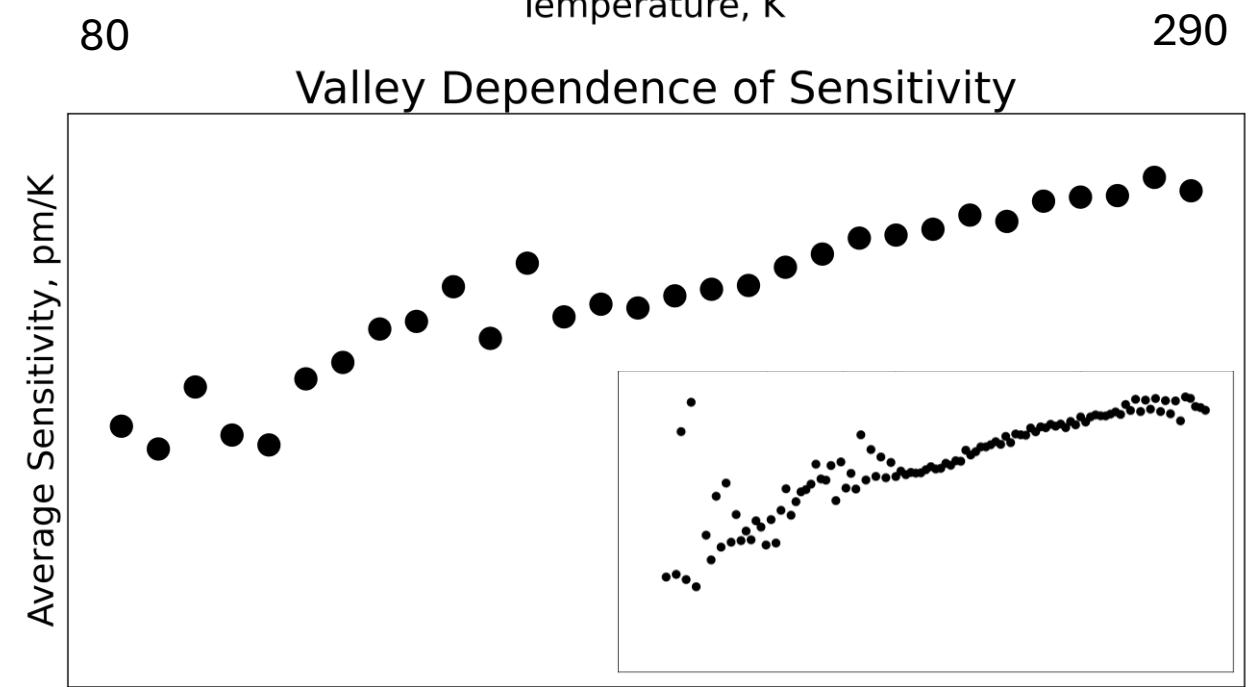


Water level monitoring?

Our Unique Approach, Methodology and Promising Results



- FBGs tested at cryogenic temperatures up to approximately room temperature.
- TFBGs show more consistent sensitivity across temperatures, as opposed to the normal FBG sensitivity's high temperature dependence.
- Choosing a data point closer to the Bragg peak may yield higher sensitivity.



- Work may soon begin on nanomaterial integration, to investigate the effect a nanomaterial coating may have on FBG sensitivity.