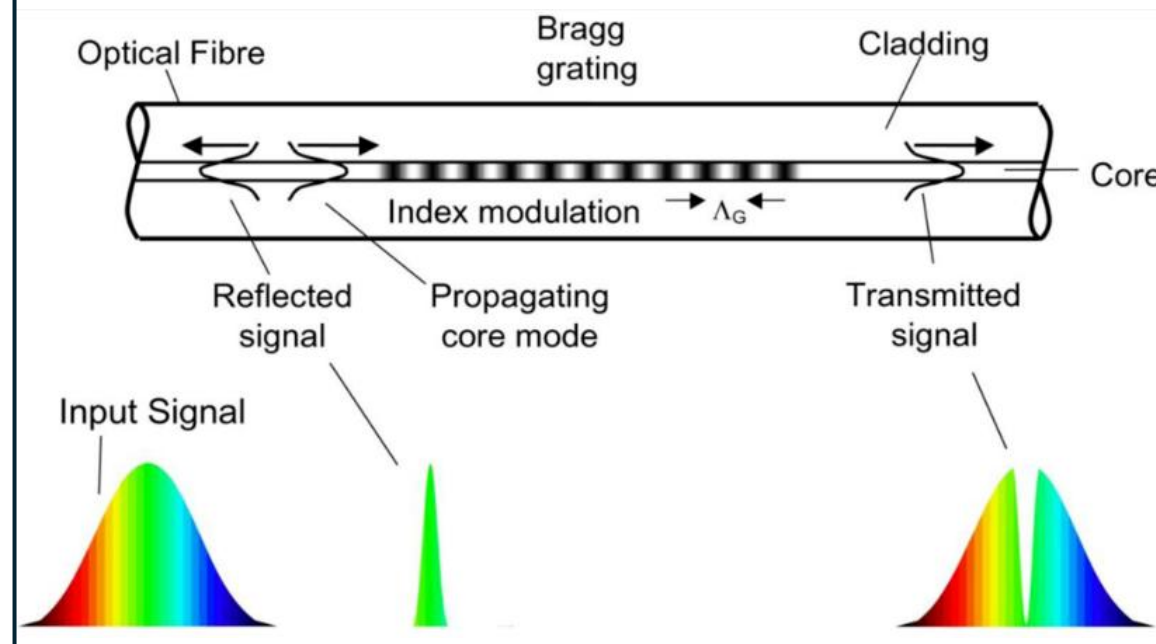


Motivation and Background

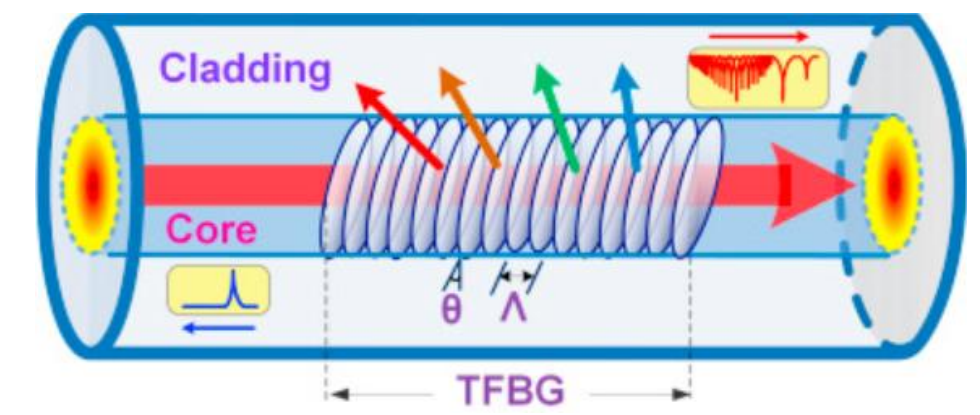
Fiber Bragg Gratings for Sensing Purposes



- 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.

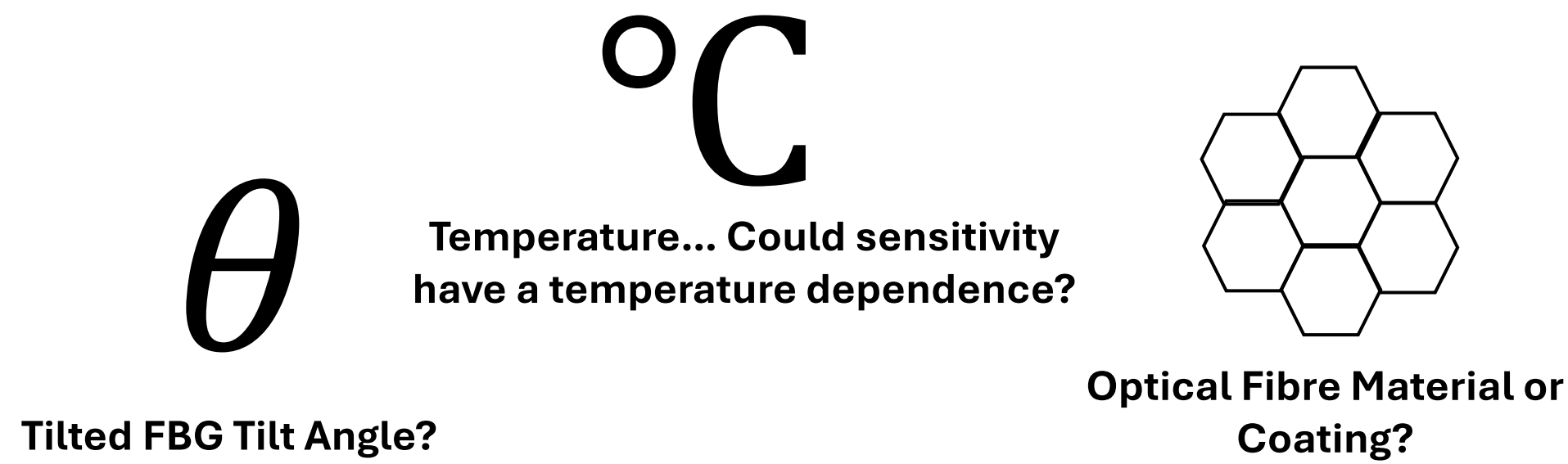
How Can We Improve Sensitivity and Consistency?

- 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

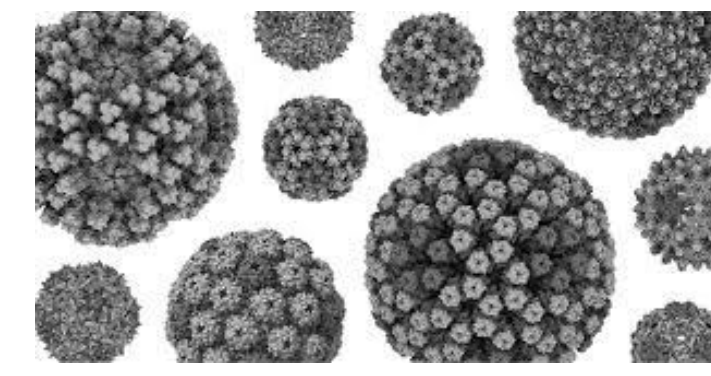
What factors affect sensitivity, and in what way?



What other sensing capabilities do FBGs have?



Salt Concentration?

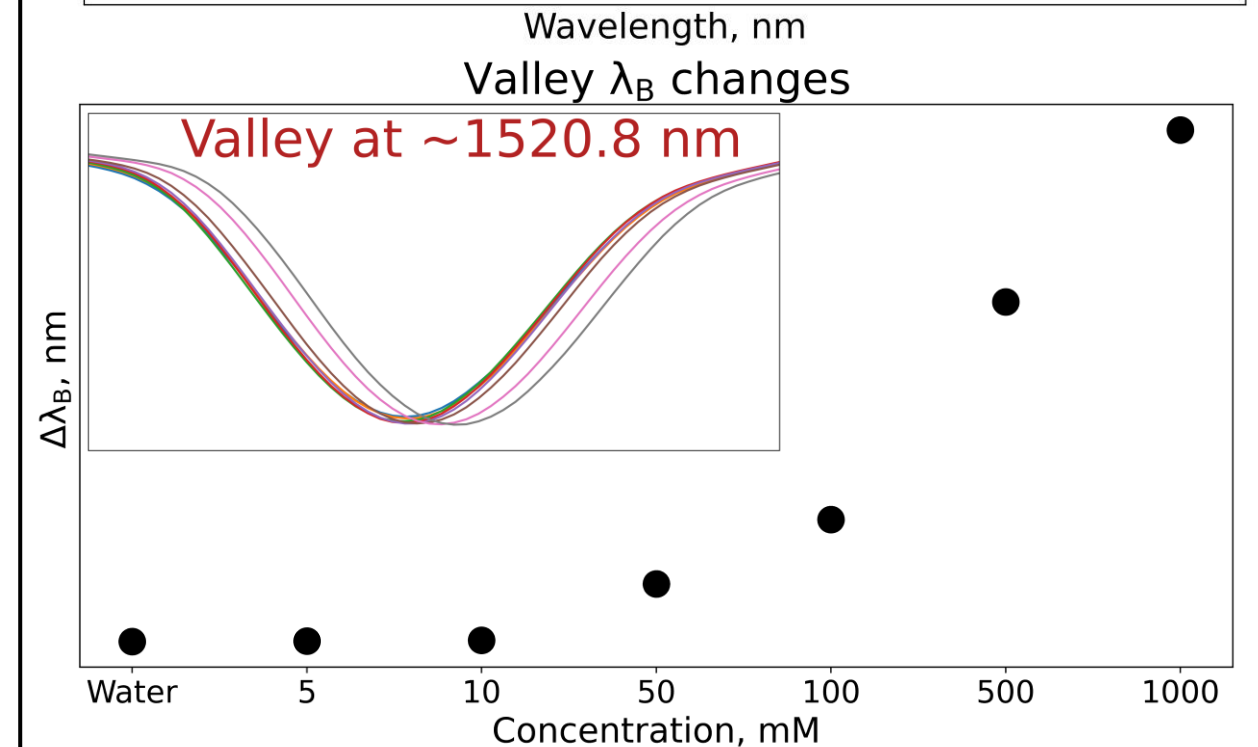
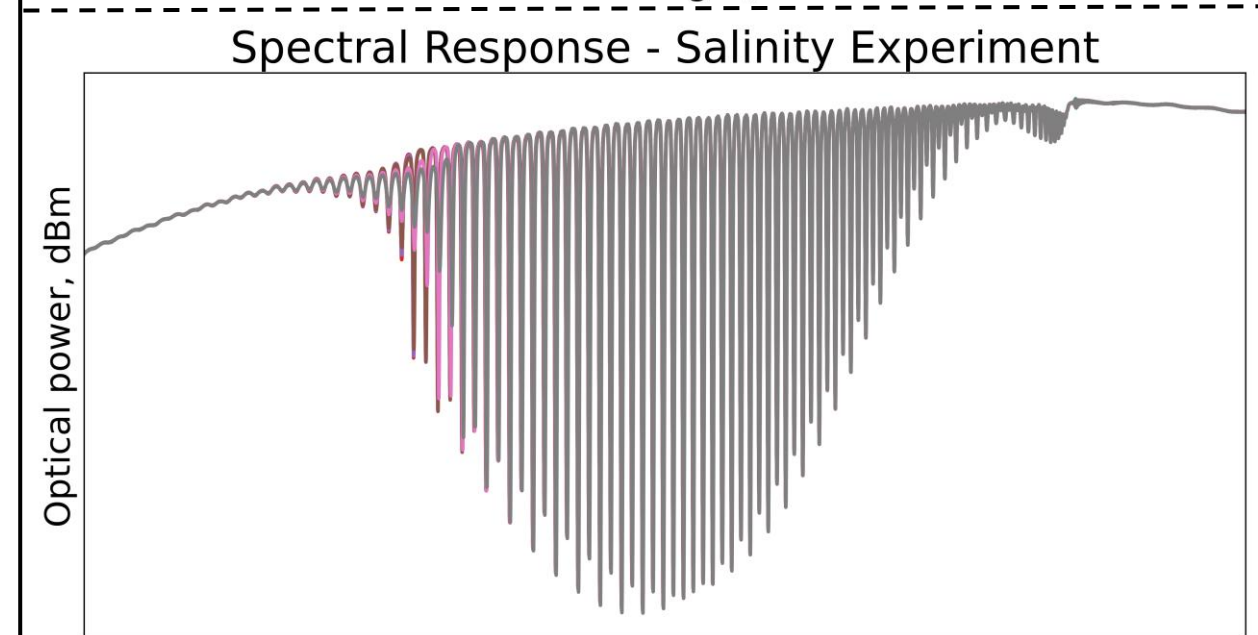
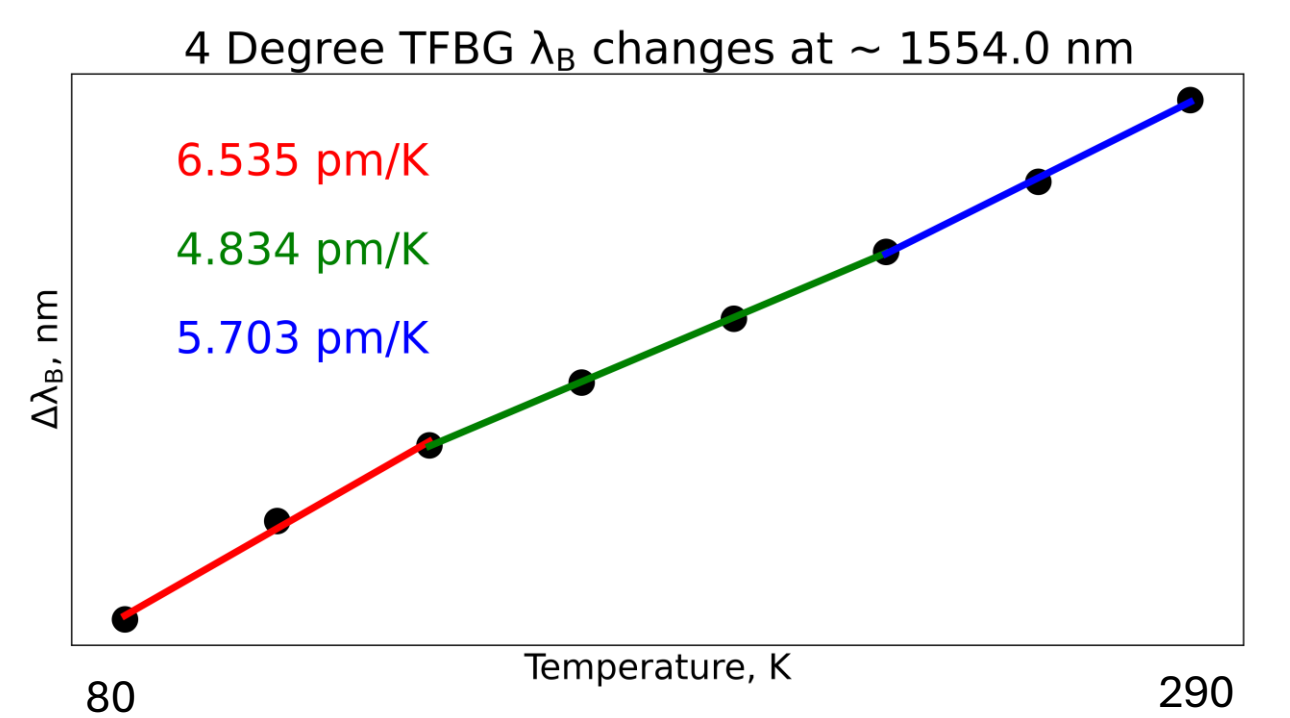
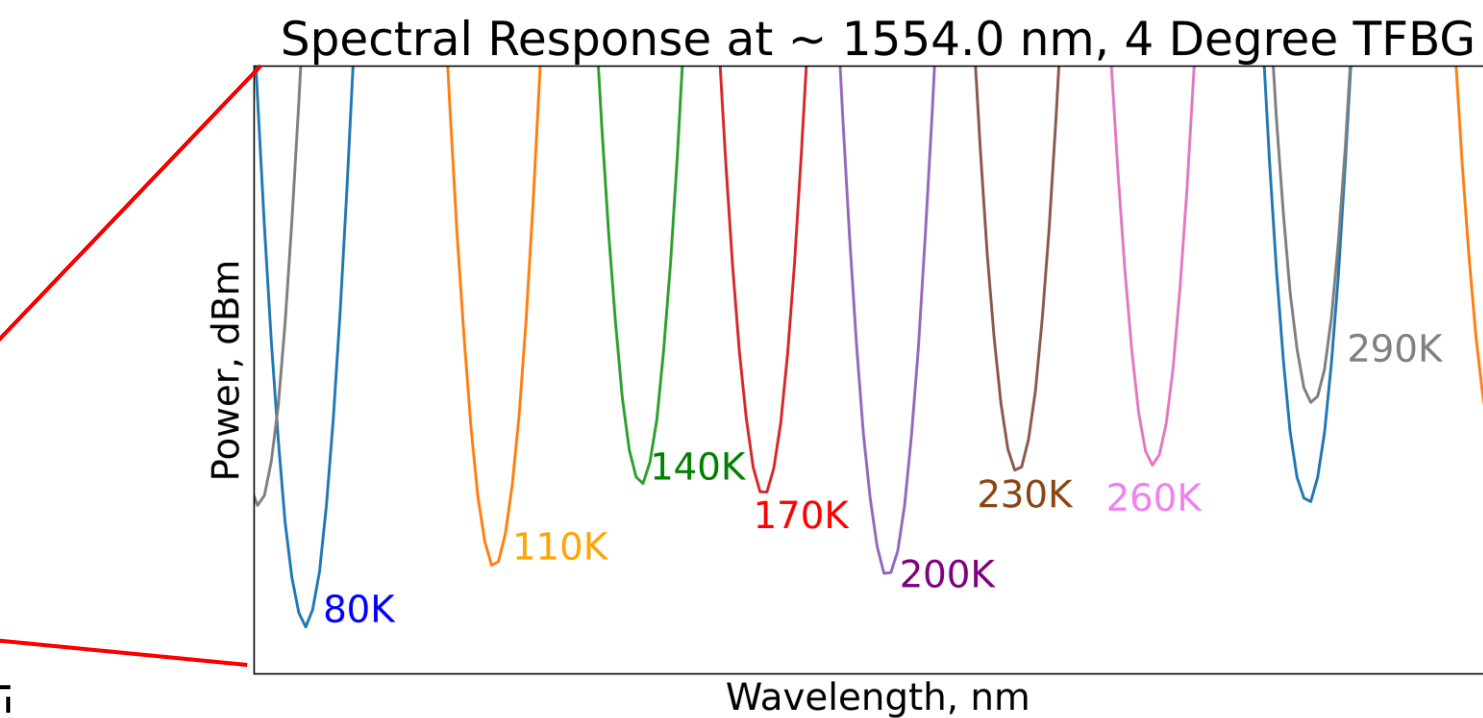
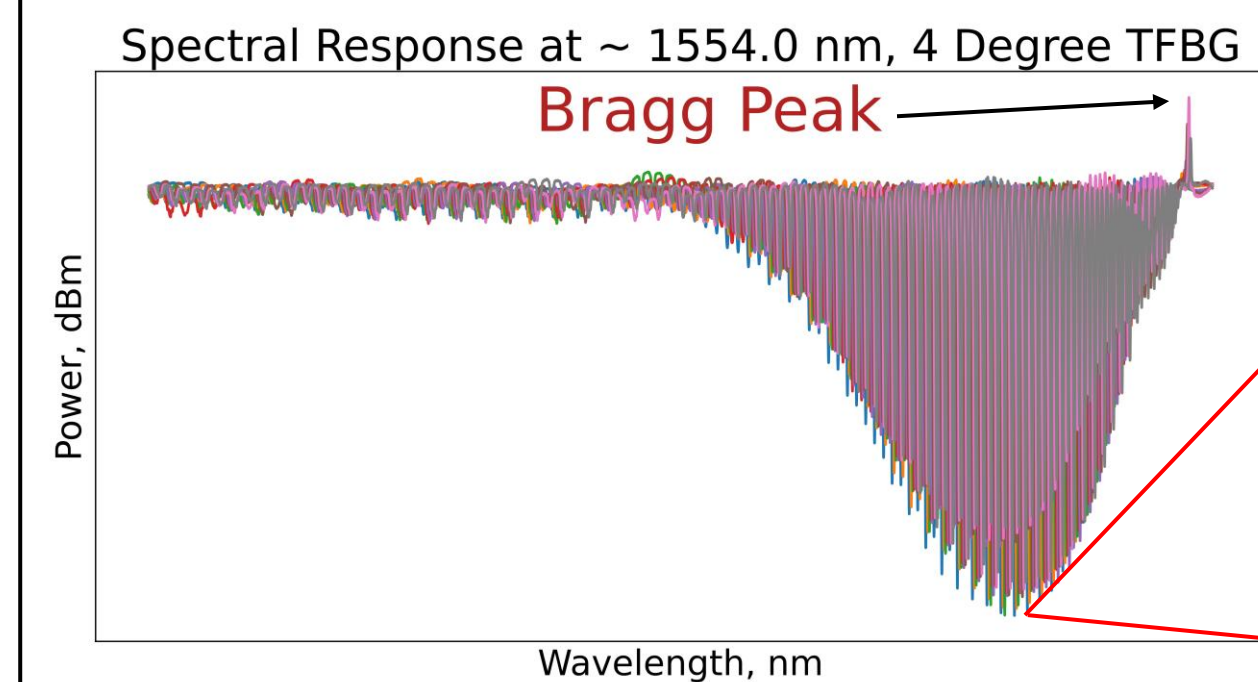
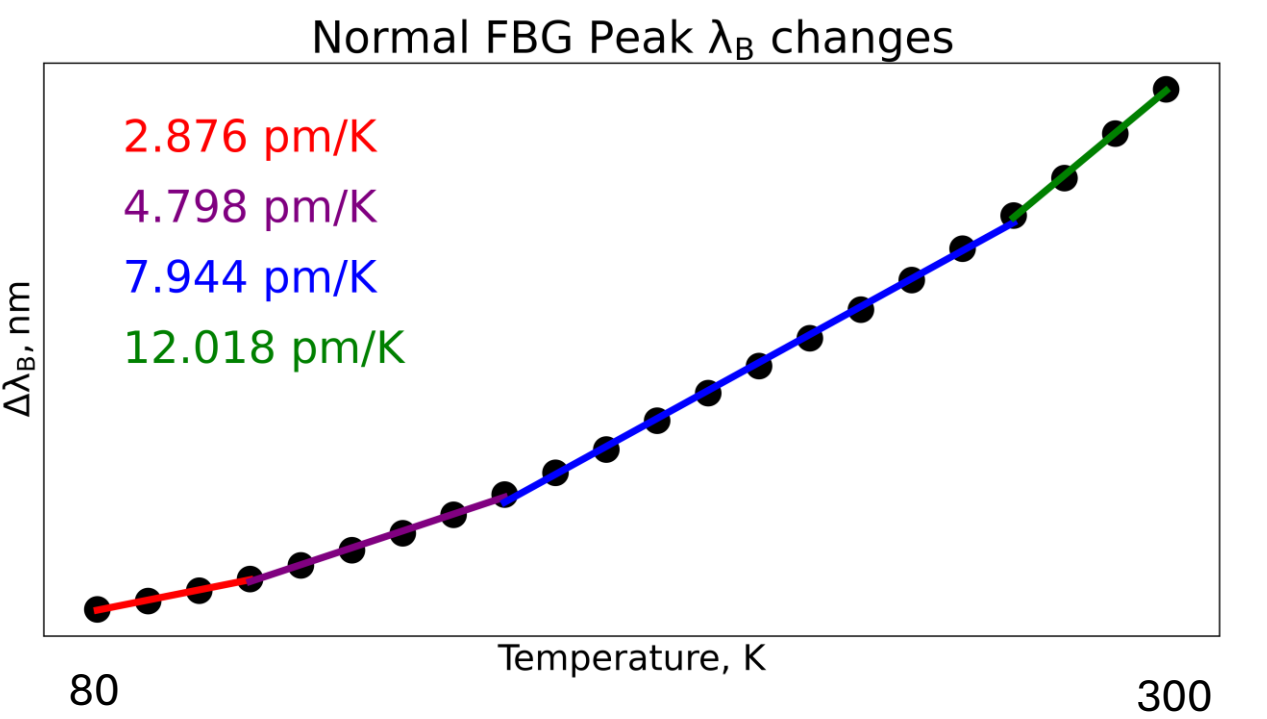
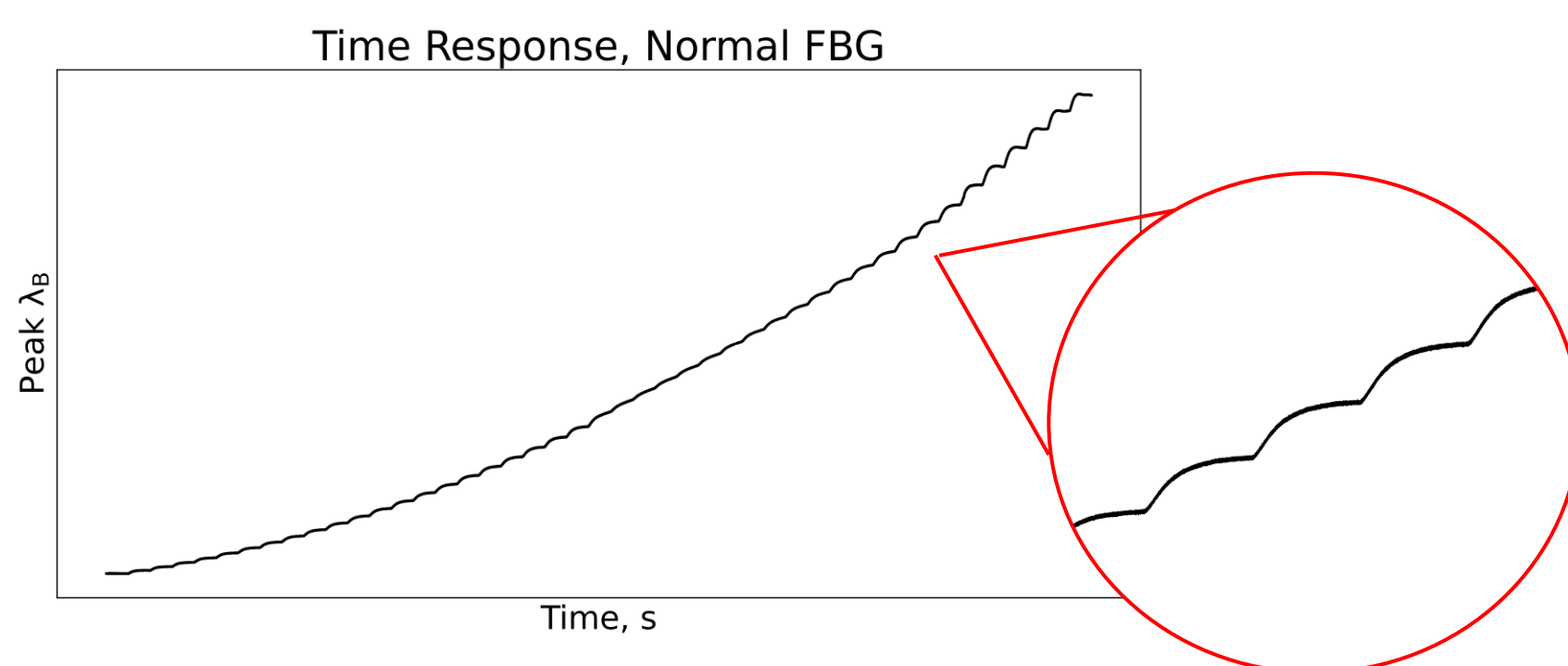
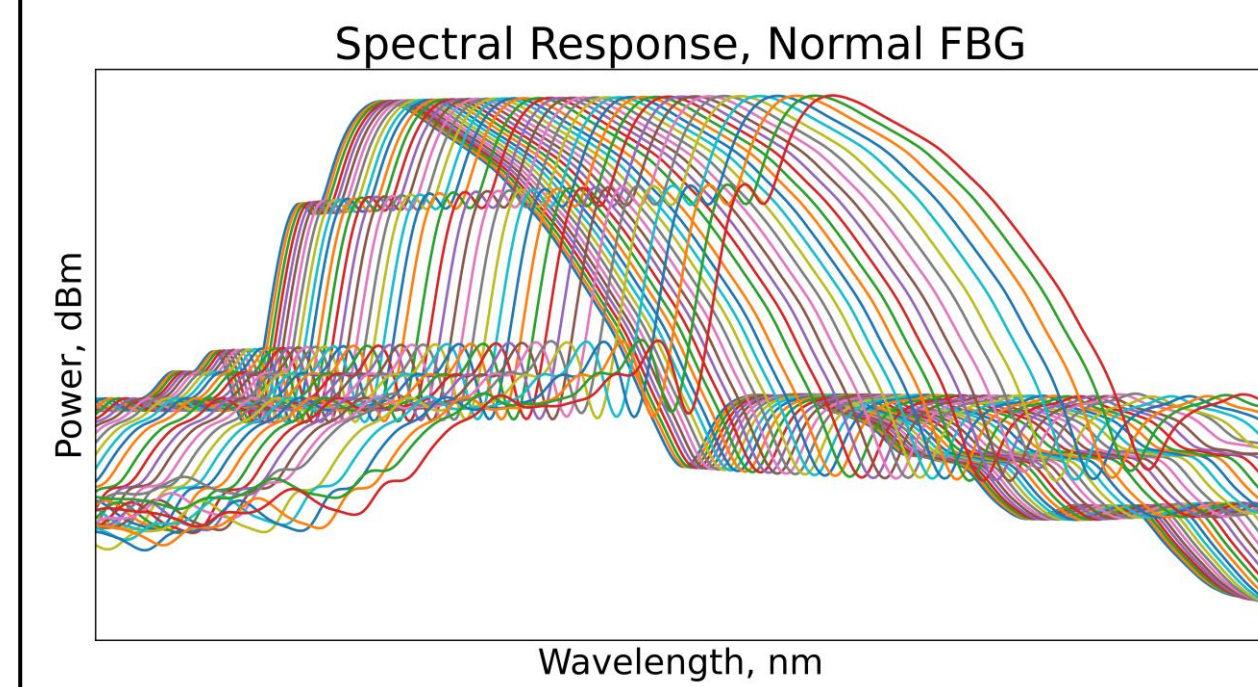


Protein/Virus Detection?

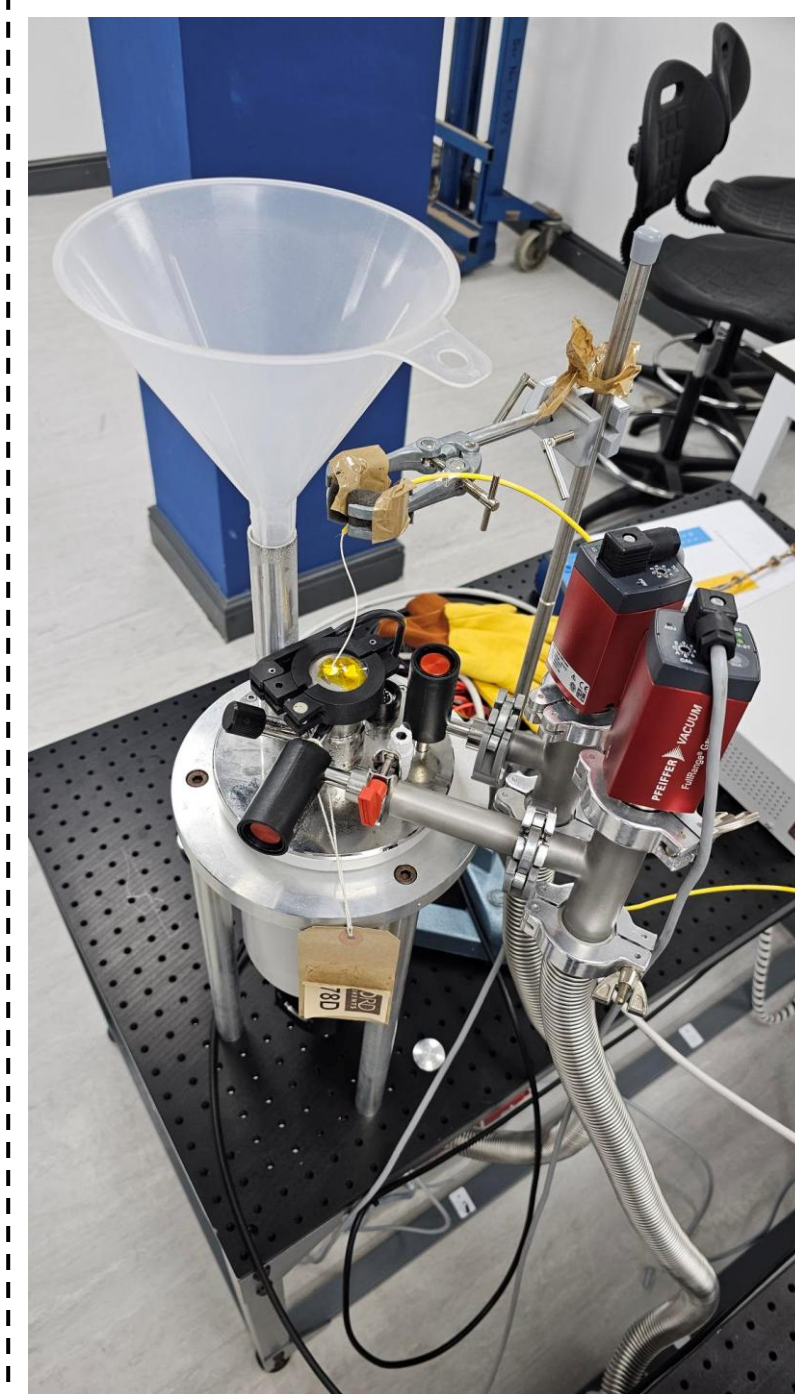


Water level monitoring?

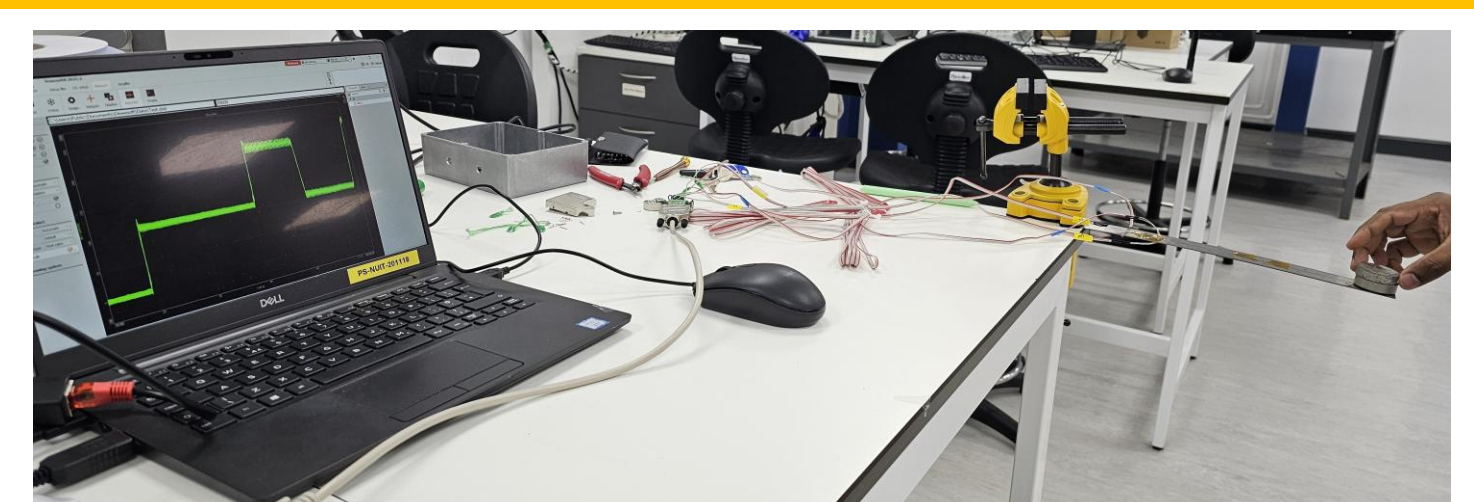
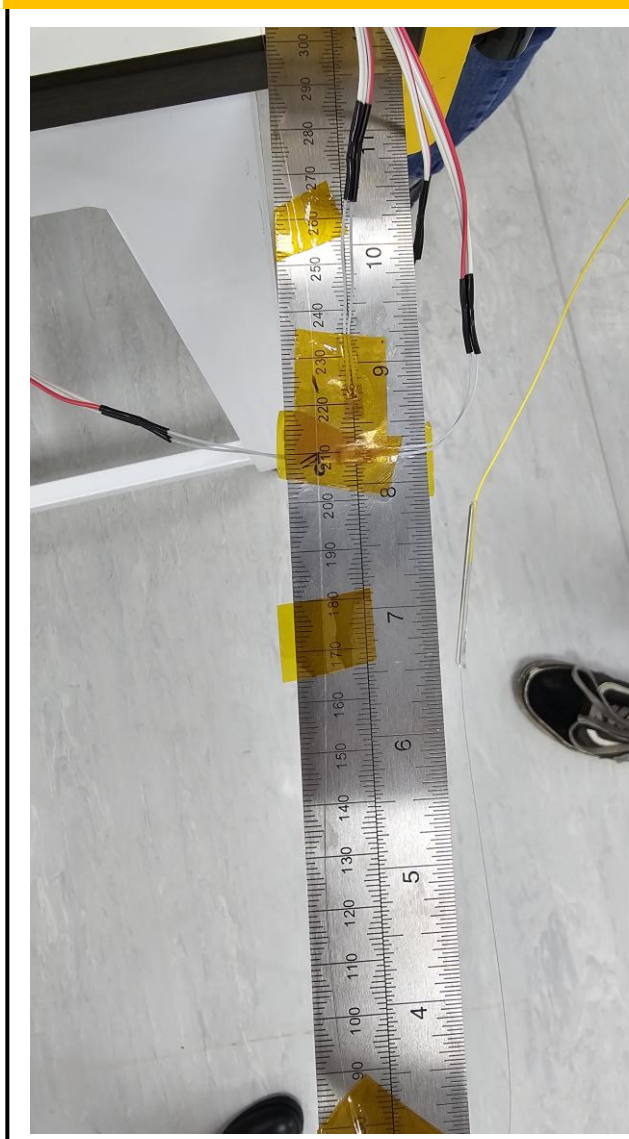
Our Unique Approach, Methodology and Promising Results



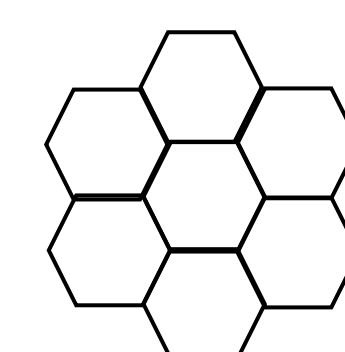
- FBGs tested at cryogenic temperatures up to approximately room temperature.
- TFBGs show more consistent sensitivity across temperatures, as opposed to the normal FBG sensitivity's high temperature dependence.
- Choosing a data point closer to the Bragg peak may yield higher sensitivity.



Future Direction of Research



- Dr Sridevi Siddarama and Joshua Foxton are continuing the sensing experiments with respect to **strain**.



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