LAr R&D Progress Updates

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4/8/25

BROOKHAVEN
NATIONAL LABORATORY

Lab Safety and Space Management

- **HighBay AC work**
  - LOTO on the power panel removed, crane LOTO is still
  - Most of installation work is done, waiting for final inspection
- **Network outage**
  - A network outage planned tomorrow at 7am for 15 mins
  - A scheduled software upgrade on the network switches
- **Highbay Door**
  - Please make sure the entry door closed at 4:30p
  - Close the opened door after 4:30p
  - Check the emergency exit when passing, close it if you see it is open

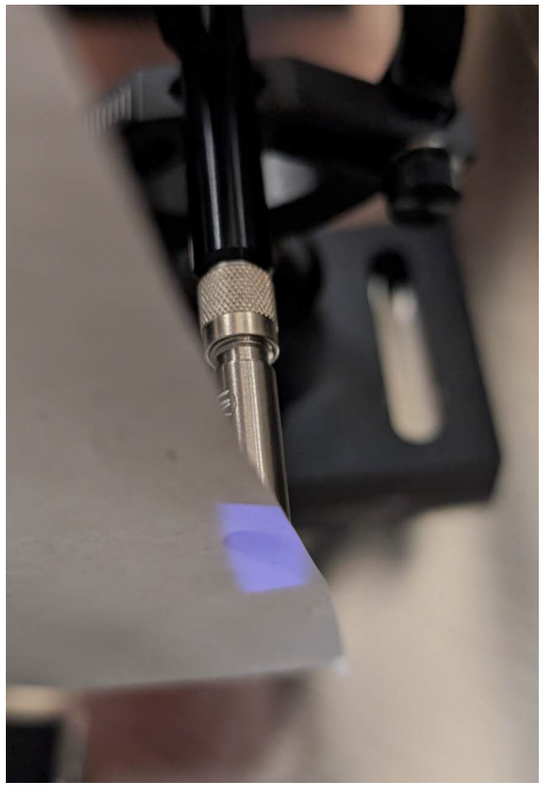
Diamond emission spectrum measurement

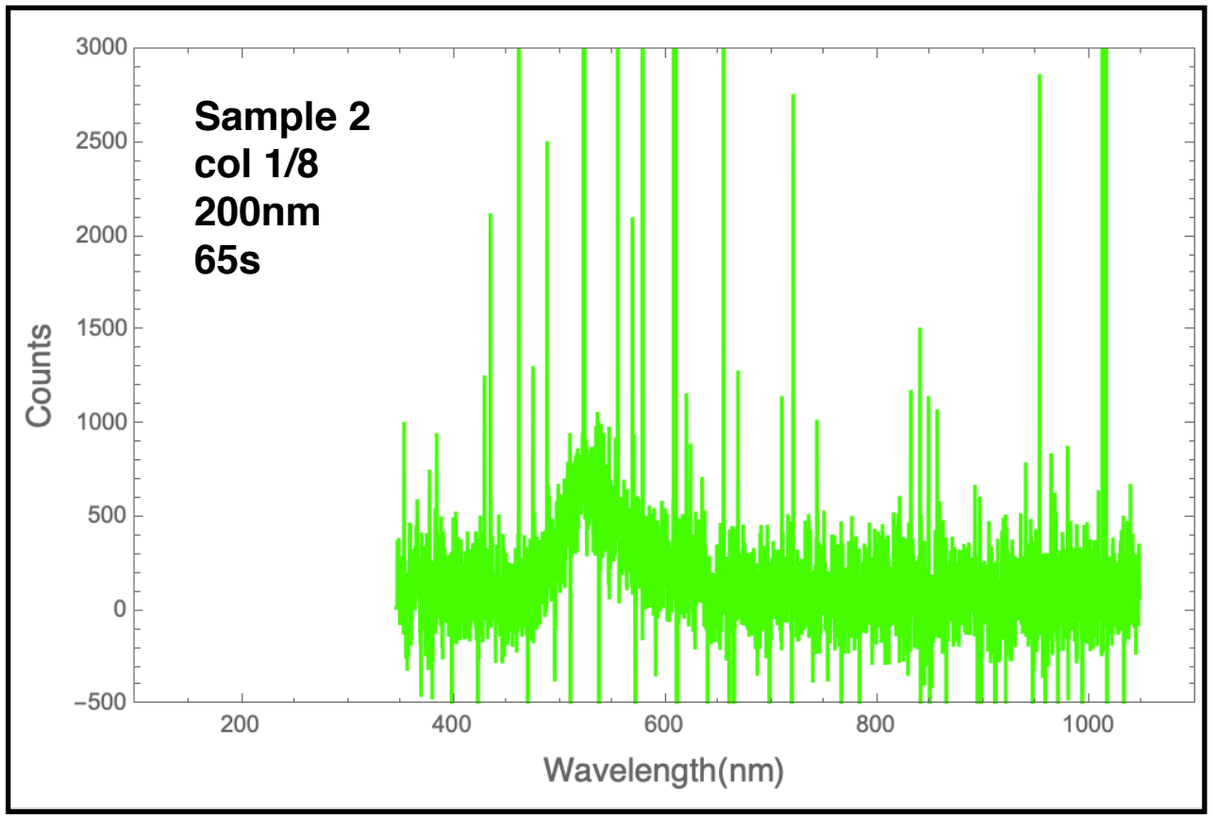
- **Improvement suggested by Thomas**
  - Put the collimator close to the sample
    - Given the emission of the sample is isotropic, getting the collimator as close as to the sample
    - The sample is literally set up in direction contact with the collimator now
  - Increase the integration time
    - Given the light production is significantly lower than his setup with Laser or NSLS source
    - Running the spectrometer at maximum integration time 65s

Sample 2

Diamond Substrate Emission Measurement Preliminary

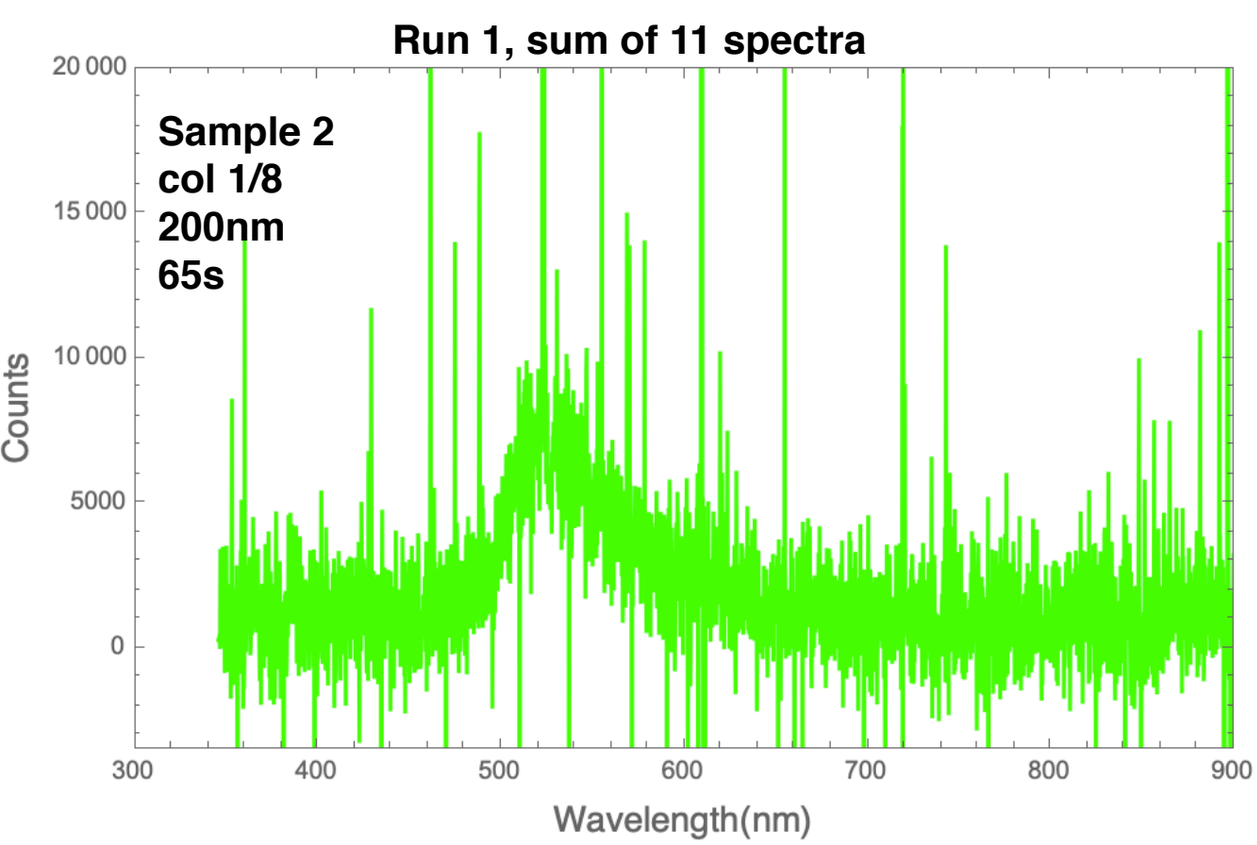
- **Preliminary results**
  - Sample 1 is no available, UV spectrometer is not available, only tested with spectrometer with 345 nm minimum range, with both 1/8 and 1/4” collimator
  - The spectrometer was adjusted with the maximum signal with full spectrum
  - With 65s integration time at 200 nm wavelength, with 1/8 collimator, after background substraction, the emission spectrum was observed for the first time last week.

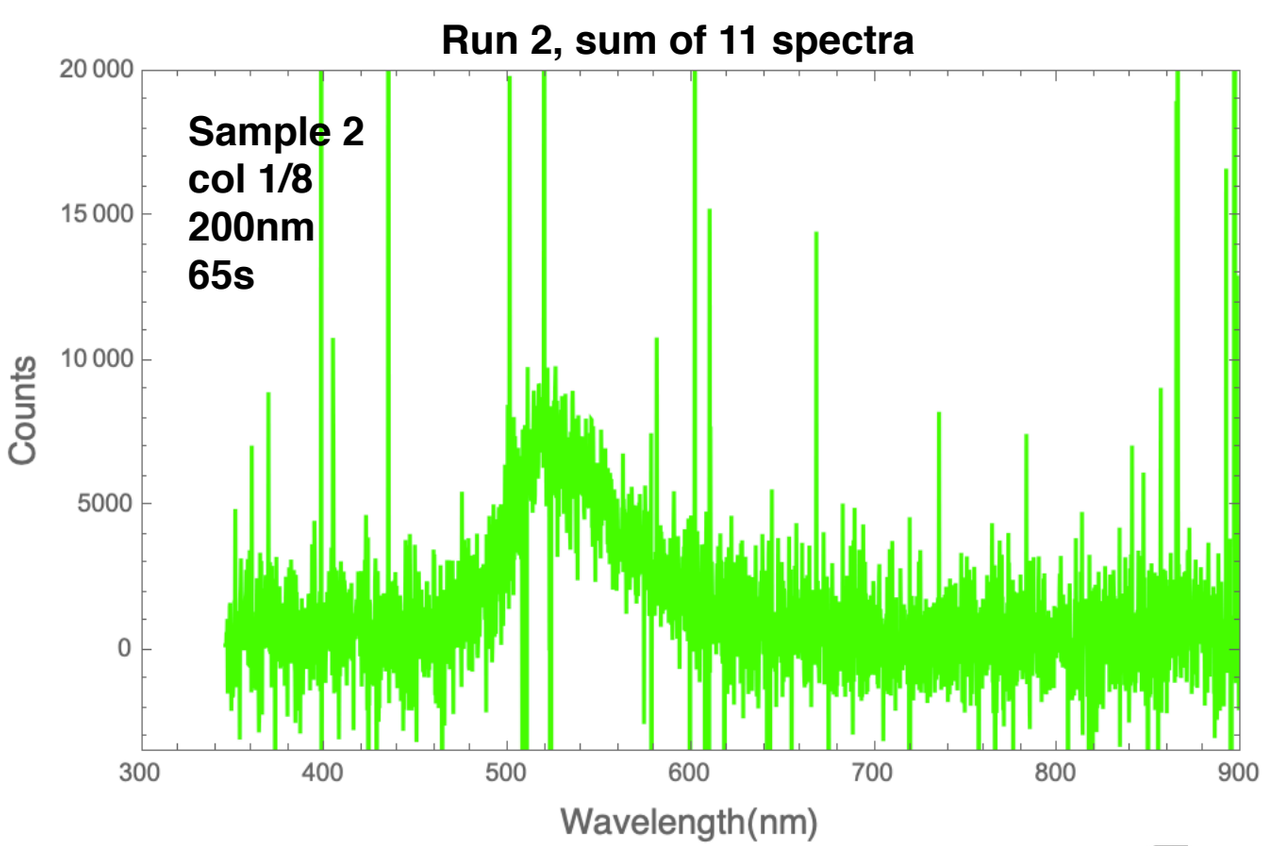




Diamond Substrate Emission Measurement Preliminary

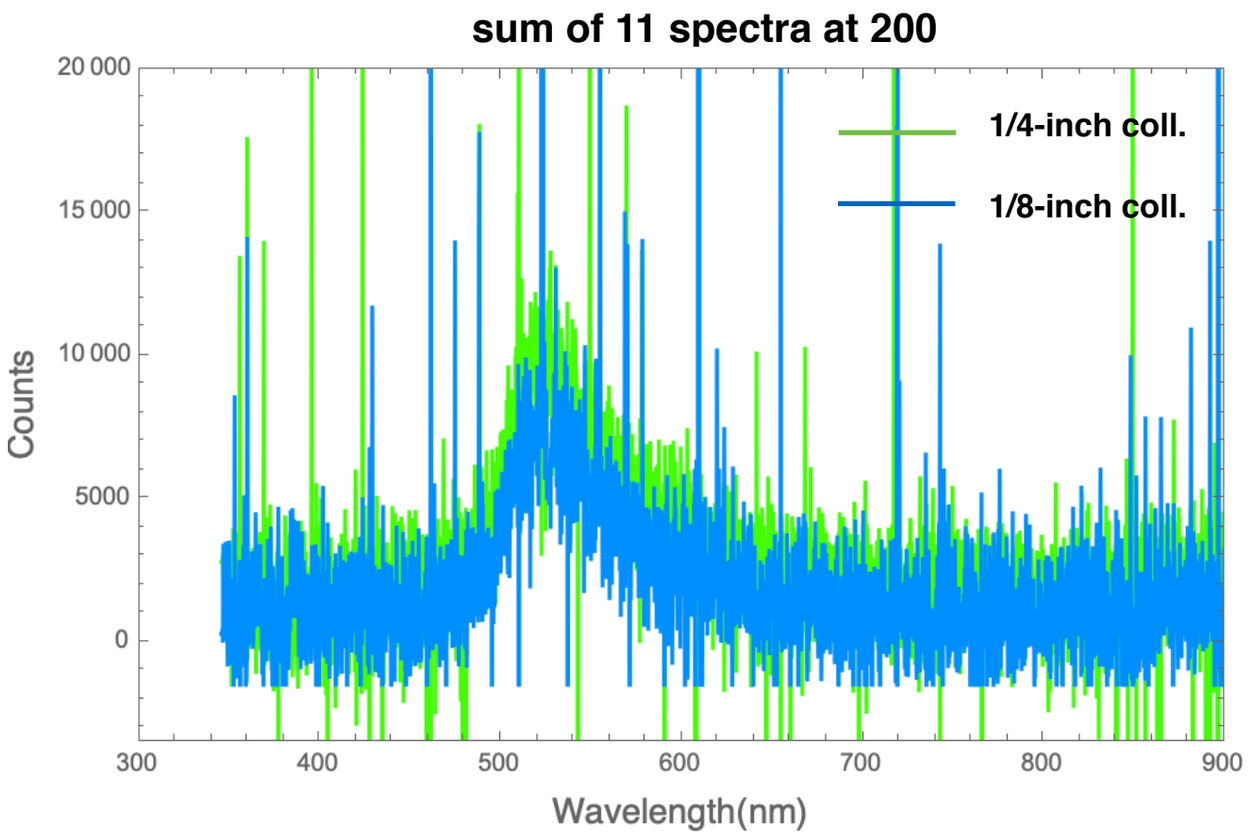
- **Results with 1/8 UV collimator**
  - Still no emission observed at 266 nm excitation
  - To further improve the signal to noise, I manually took 10 additional spectrum and summing together
  - To ensure it repeatable, the 200nm measurement was repeated

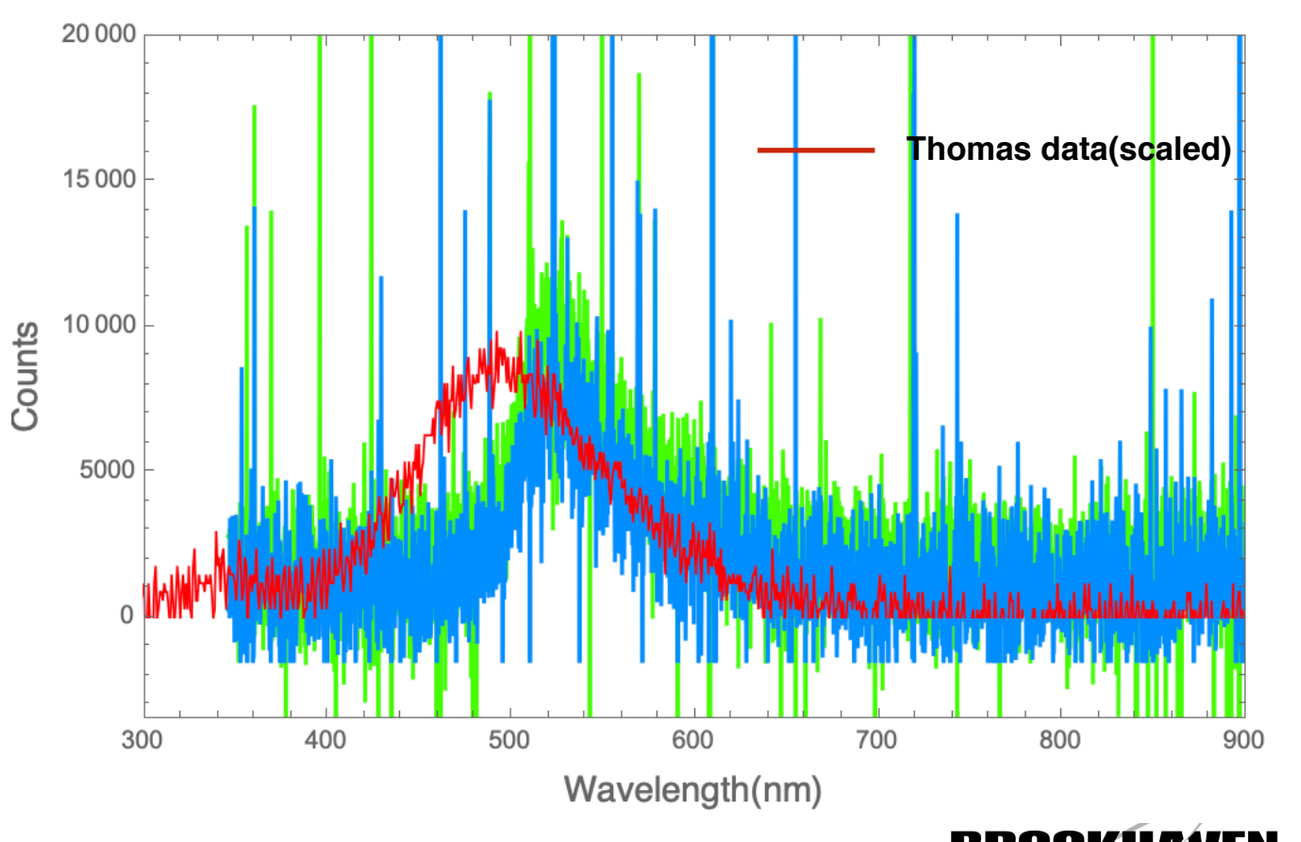




Diamond Substrate Emission Measurement Preliminary

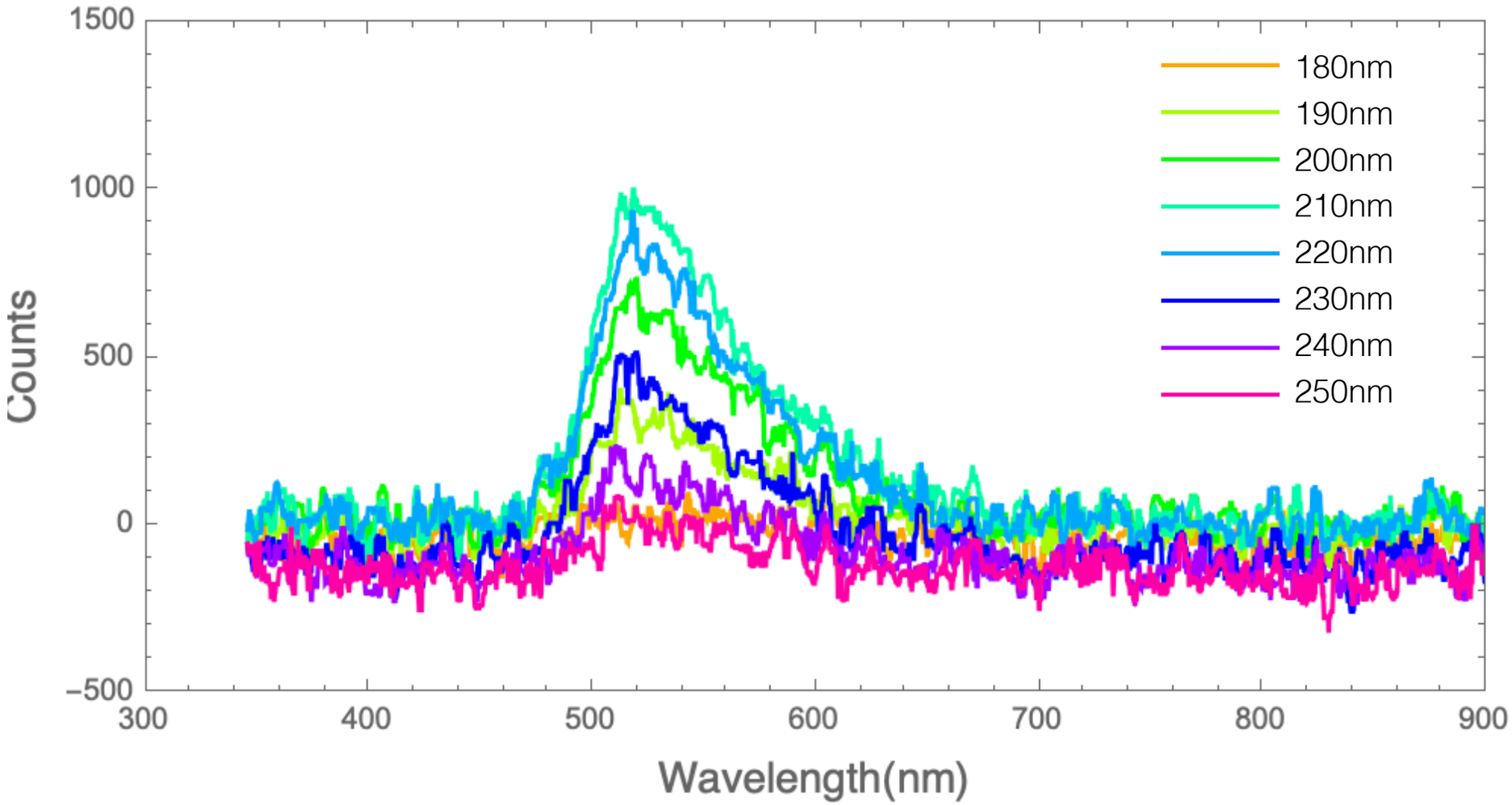
- **Results with 1/4 UV collimator with 200nm**
  - Expecting more photon collection
  - Add Thomas' measurement just as a reference, diamond substrate with LiF on top, different wavelength at 266nm

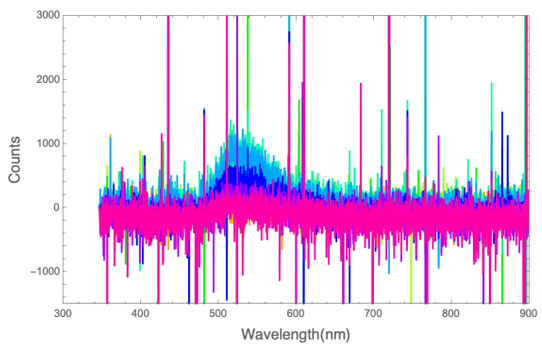




Diamond Substrate Emission Measurement Preliminary

- **Study of diamond coating wave length response**
  - Check the spectrum peak amplitude with different wavelength
  - Strongest emission at 210nm, peak visible 190-250nm
  - Spectrum filtered with a median filter for visualization





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To Do List

- Sample 1 expected to be available this week
- Just got the UV spectrometer with better sensitivity
  - Much shorter integration time limit of 5 sec
- Repeat the emission measurement with
  - Both 1/4 and 1/8 collimator
  - Both UV and non-UV spectrometers
- Finish the mechanical drawings of the test chamber