Large mirror test stand

Jan Vanek
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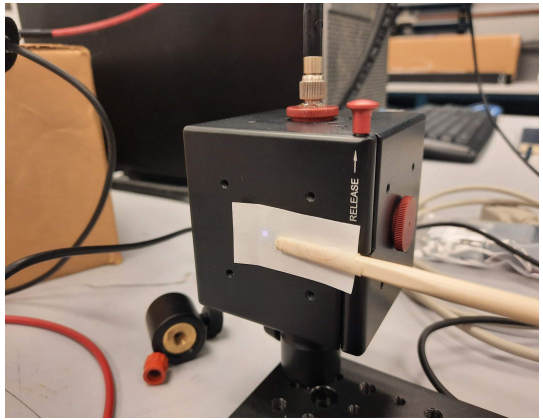
Overview

- Optical fiber tests
- Mounting update
- Coated full scale mirror

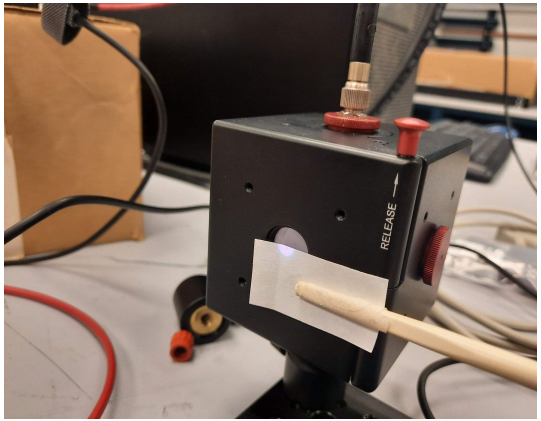
Optical fibers – beam spot size

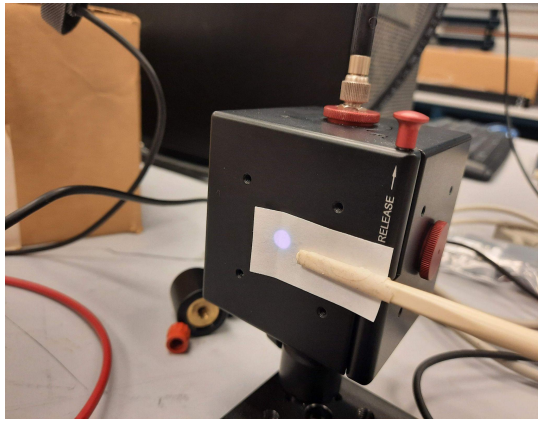
- Tests of different fibers from light source to collimator (200 μm, 600 μm)
  - Beam spot size for two different input fiber diameters
  - 200 μm spot small – seem to cause issues with readout (see next slide)
  - 600 μm – spot size larger, but seems to be reasonably small for input port on integrating sphere?
  - Will be tested with mirror inside of test stand

200 μm



600 μm

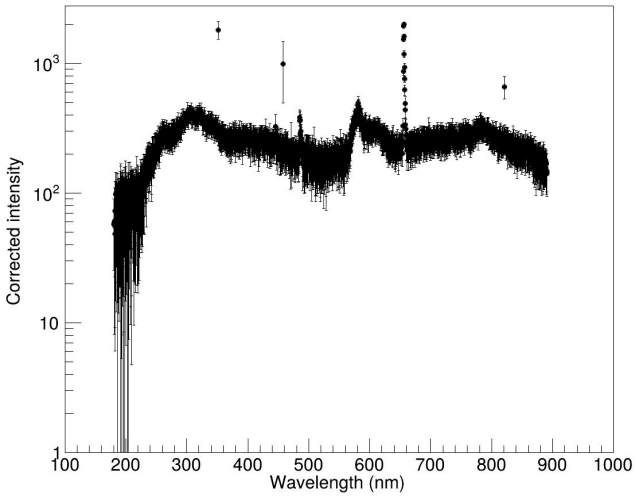




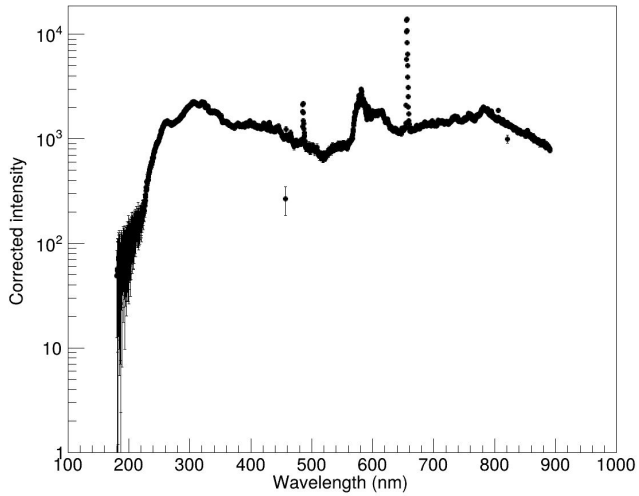
Optical fibers – from light source

- Tests of different fiber combinations
  - From light source: 200 μm vs. 600 μm
  - From integrating sphere to spectrometer: multi-core fiber
  - Integrating time 1s, 10 measurements for each spectrum (mean, standard deviation)
  - After dark current correction
- Small fiber does not seem to provide enough light for the spectrometer

200 μm

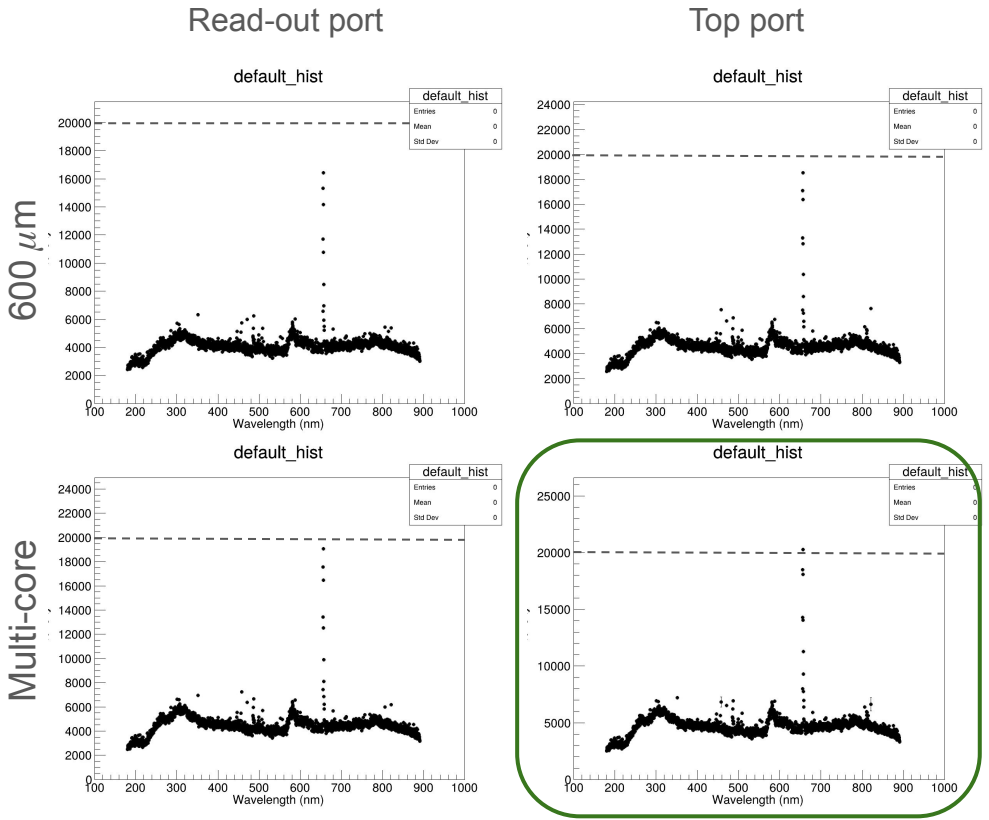


600 μm



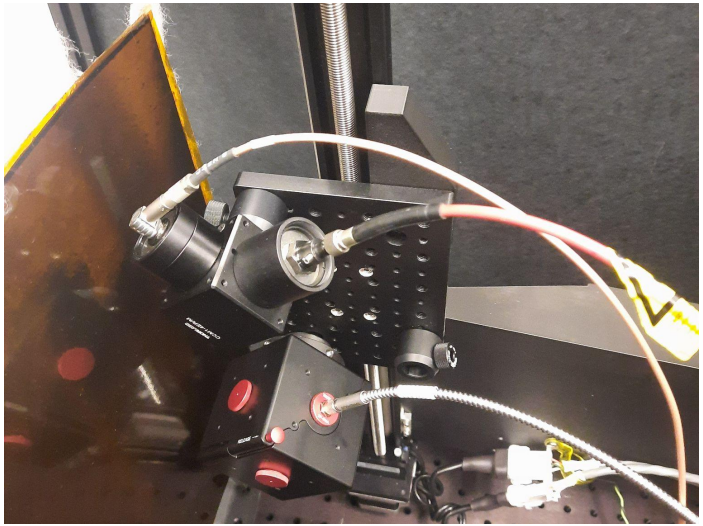
Optical fibers – from integrating sphere

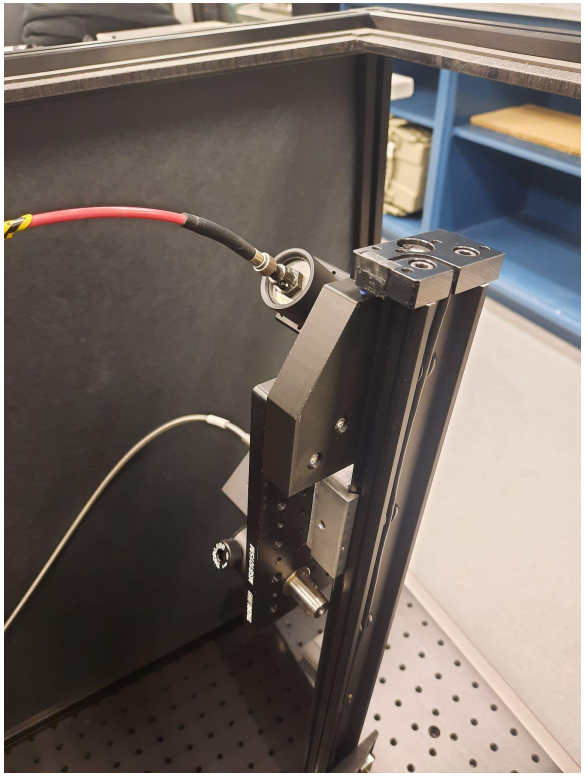
- Tests of different fiber combinations
  - From light source: 600 μm
  - From integrating sphere to spectrometer: 600 μm vs. multi-core
    - Two different ports – read-out port vs. top port
  - Integrating time 1s
  - Uncorrected measured spectra (with dark current baseline)
- Multi-core fiber provides slightly more light than 600 μm
- Top port gives best light yield



Mounting – update

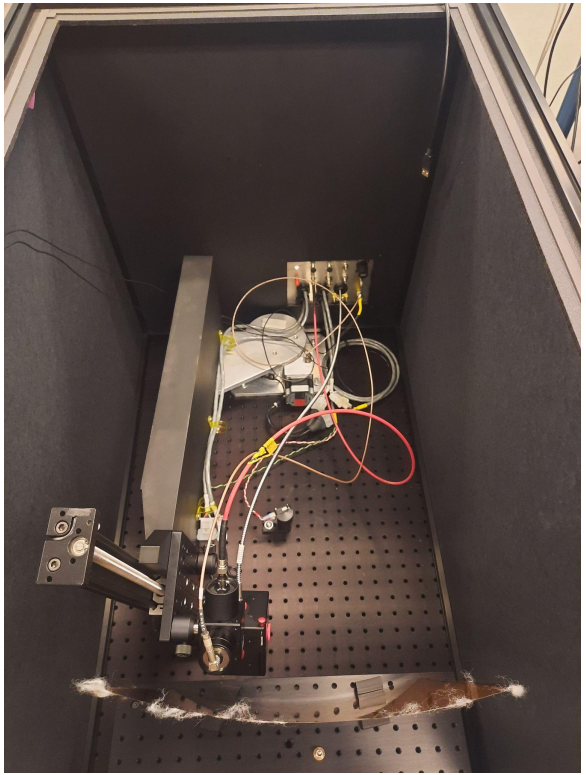
- New upper stop for linear stage
  - To prevent optical fiber hitting box lid
- Photodiode installed in the box
  - Sean put the photodiode in small housing –





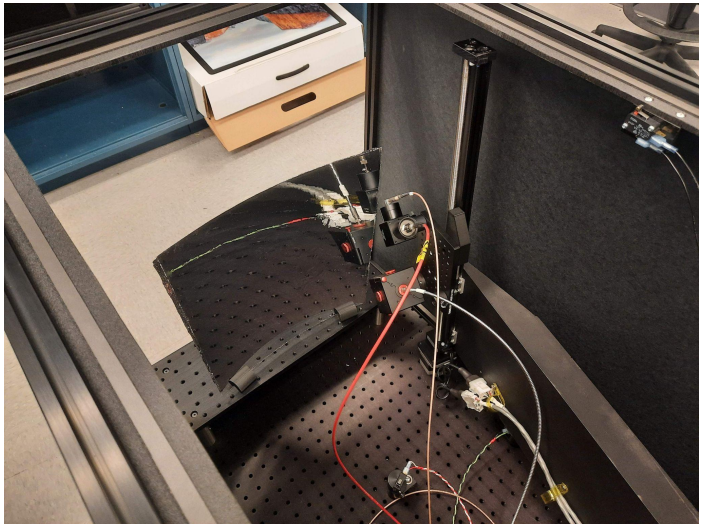
Mounting – fibers and cables

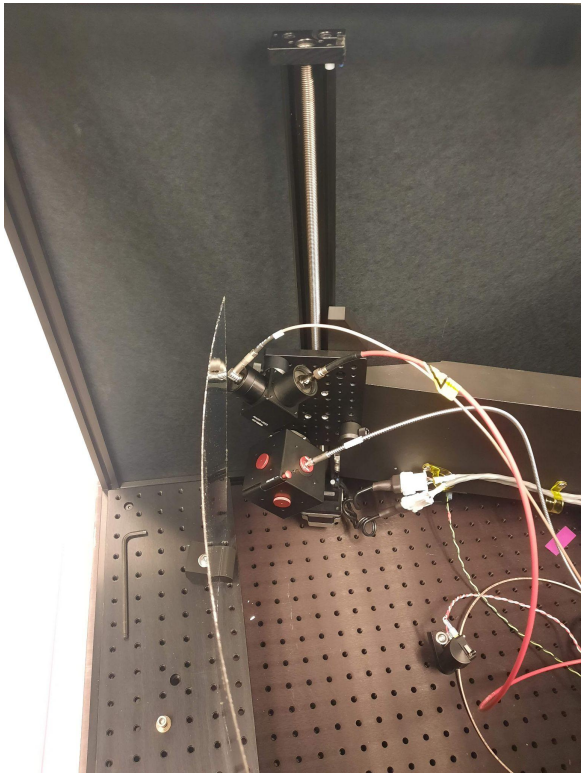
- Tested fiber and cable routing inside of the dark box
  - Full range of motion of stages tested
  - Selected integrating sphere output port (see photo)
    - Other ports can interfere with box walls
  - Custom 3D printed plug for multicore fiber



Coated full scale mirror

- Coated full scale mirror arrived at BNL
- Updating mirror holders
  - Coated mirror sits vertically, but needs to be tilted
- First test measurements after mounting is resolved





Estimated work timeline – previous status

1. May
   a. Readout – finished
      i. Result: Readout software successfully installed and successfully tested
   b. Steering of stages
      i. Both rotational and linear stage operational
      ii. Cross-check homing precision for rotating stage – should be good enough for now
2. June
   a. Development and optimization of steering and readout software
   b. Prepare for scans of small and large mirrors (finish by end of June)
      i. Installation of the optical table to the dark box – need full scale or small curved mirror
      ii. Optimization of output data format
      iii. Missing: Curved mirror holders (full scale and small sample)
      iv. Goal: First test scans
3. July
   a. Deploy full reflectivity scanning framework, including documentation (finish by ca. July 11)
      i. Present progress at Collaboration meeting
   b. Start full mirror scans (have ready by end of July)
4. August
   a. Make sure everything is working and properly documented for anyone to take over (by August 15)
   b. Help with any leftover items (by end of my contract at BNL, August 21)

Estimated work timeline – current status

1. May
   a. Readout – finished
      i. Result: Readout software successfully installed and successfully tested
   b. Steering of stages
      i. Both rotational and linear stage operational
      ii. Cross-check homing precision for rotating stage – should be good enough for now
2. June
   a. Development and optimization of steering and readout software
   b. Prepare for scans of small and large mirrors
      i. Installation of the optical table to the dark box
      ii. Optimization of output data format – ongoing, will be finished with coated mirror
      iii. Curved mirror holders – minor updates needed
3. July
   a. First test scans – with coated mirror (first full scale mirror coating this week)
   b. Deploy full reflectivity scanning framework, including documentation (finish by ca. July 11)
      i. Present progress at Collaboration meeting
   c. Start full mirror scans (have ready by end of July)
4. August
   a. Make sure everything is working and properly documented for anyone to take over (by August 15)
   b. Help with any leftover items (by end of my contract at BNL, August 21)