pfRICH HRPPD Magnet Test at BNL SMD

Run Plan (abridged)

- **Objective**: evaluate the HRPPD sensor performance at various inclinations inside a uniform magnetic field up to 2T

- **Setup**: Place an HRPPD tile in a light tight enclosure and use an attenuated laser source to measure the single photon response within a magnetic field. We will use the warm 18D72 dipole magnet at the BNL SMD, which can generate a max field of ~2T. The HRPPD enclosure has pivot points that allow the HRPPD to be rotated manually relative to the magnetic field lines in the bore. The fixture that holds the HRPPD enclosure is made out of 8020 extruded rails and is able to be manually slid in and out of the field (with no need to ramp down the field in the process).

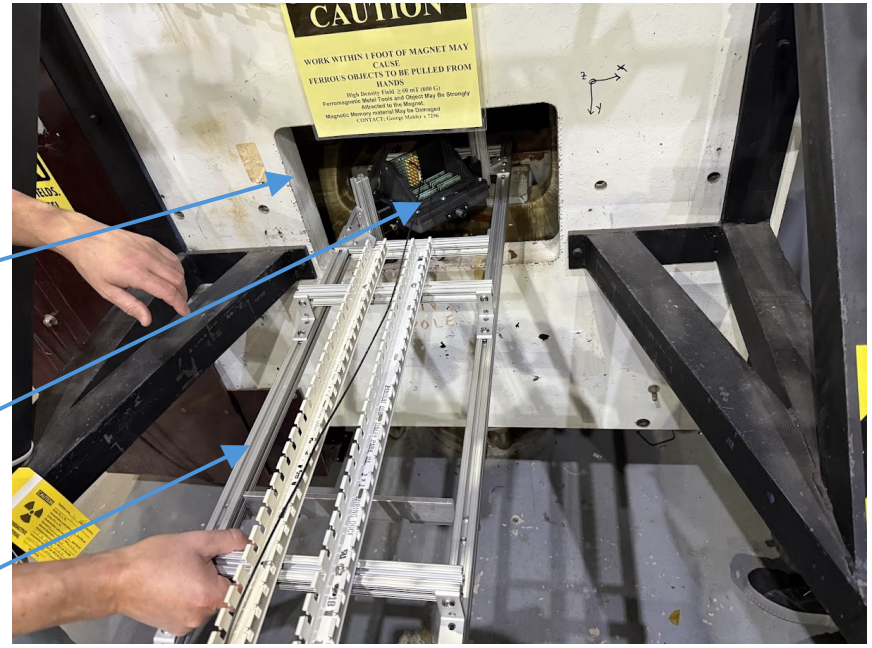
- **Run plan**:
  - Take noise pedestal measurements (HV On, laser OFF, B-field On)
  - Take B-field Off baseline measurements (for a minimum number of laser triggers)
  - Take measurements at ~ 0.2T increments from (0– 2T) over range of angles (ie, the angle between the normal to the HRPPD window relative to the field lines) from 0^o – 30^o(?), the maximum angle allowable in the 6” (H) x 16” (W) bore opening.
  - Take data with field direction reversed relative to the HRPPD (rotate enclosure until it is upside down)

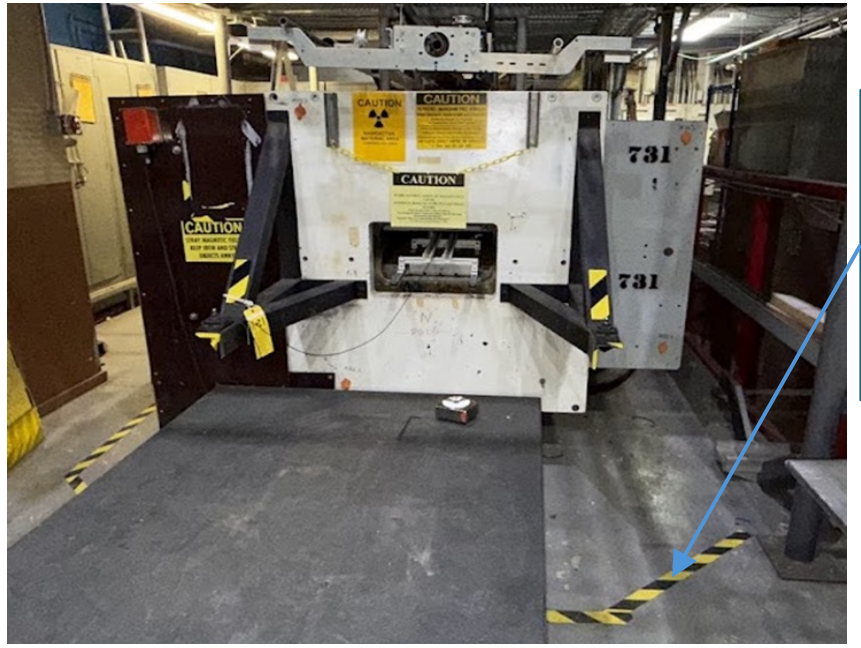
Setup

6” (H) x 16” (W) bore opening

HRPPD enclosure

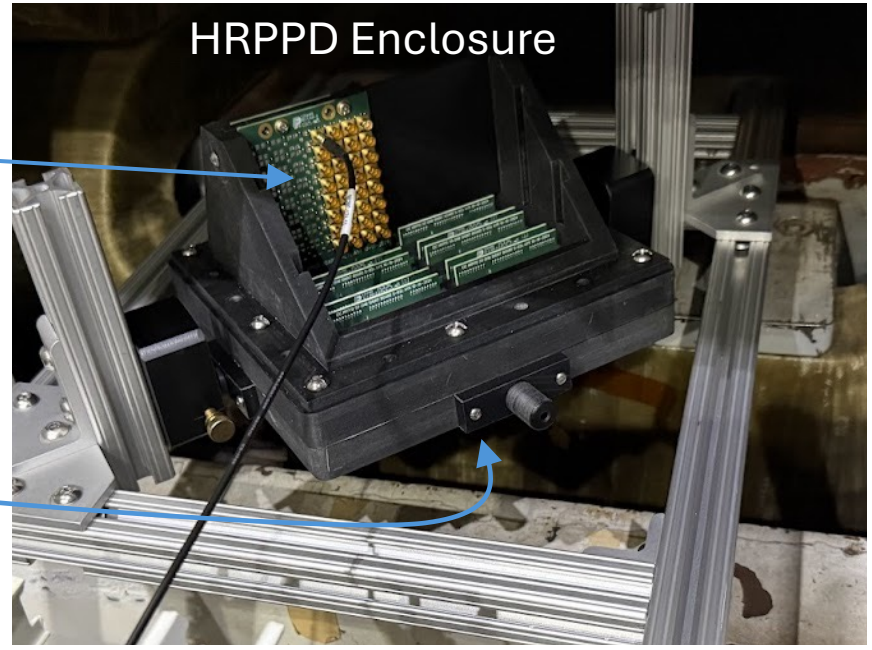
HRPPD 8020 fixture





Yellow/black tape marks >5G line that cannot be passed w/o authorization

HRPPD “MCX cards”



Fiber delivers photons from laser into port at the bottom of the enclosure

General work space around magnet

Schedule

Prep Week

- ❑ Nov. 12 – 14 (Wednesday – Friday)
- Transfer all equipment to SMD dipole area
- Set up work space, electronic racks (2), power supplies, DAQ PC etc.
- Test fit 8020 sliding fixture in magnet bore and decide whether mods are needed
- Ask Bill L. to inspect the setup and make any necessary mods
- Install setup in its final configuration ready for data taking and do a final check by sliding the fixture (with all services connected) in and out of the bore
- Take some baseline field off data with the setup in and out of the bore
- Turn magnet on to moderate field (~1.2T) and take some data (no angle scan needed)
- Meet with LSO Chris Weilandics so he can inspect and sign off on the final setup with the laser installed

Data Taking Week

- ❑ Nov. 17 – 21 (Monday – Friday)
- Workday: 8am - 4:30pm (when SMD techs are available)
- At least one BNL employee with >5G magnet authorization needs to be present during data taking (ie, to manually change the HRPPD angle)
- Take data according to run plan: start out at low field and make ~2T measurement the last one (just in case power supply fails)
- It would be great to have some **online monitoring** to ensure the data is good both while we're taking data and before we conclude the data taking campaign

Training Requirements

Requirements List

- All must read and be familiar with the Run docs: Run plan, HRPPD B-Field Studies note, Laser SOP
- All must read and sign Work Permit (being developed by SMD ESH people) to work in the magnet "Work Zone"
- Only BNL employees with the appropriate Job Assessment Form (JAF) may work within the >5G line around the magnet (yellow/black tape on the floor)
  - In order to manually change the angular orientation of the HRPPD in the B-field, the HRPPD enclosure must be pulled out of the bore, but not beyond the >5G line. It would be impractical to ramp down the field to do this every time the angle needs to be changed, therefore the plan is to keep the field on during this process
  - Anyone working within the >5G line must fill out and sign the **"Static Magnetic Fields" questionnaire**
- BNL Visitors/Guests: must determine whether they have a BNL Life # and require an escort or not (Guest Orientation (online) course may also be needed)
- On the job-site training will be performed once by SMD ESH (Marteenio, Wes) on the morning of Nov. 17 with all team members present
- Only the SMD techs (Chris and Ray) have authorization to turn On, ramp Up/Down, and turn Off the magnet power supply
- BNL work-specific training: Electrical Safety, Static Magnetic Fields
- Pre-work planning
  - Check that all parts going into bore are non-magnetic (screws, nuts, hardware,…)
  - Meet with Chris W. regarding laser SOP
  - EEI inspection needed for electronics(?)