



PQN
AQNET 02/27/2024

Plan Outline

1. Source

- Decide Source
 - Polarization/Time-Bin
 - Bulk optics/waveguide

2. Measurement System

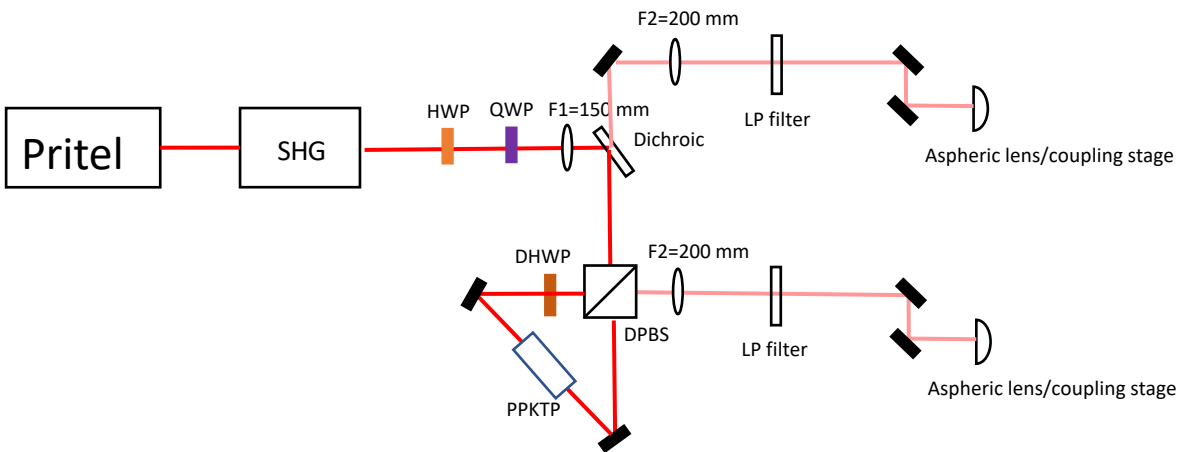
- New waveplate mounts for compactness/speed
- Package for network closet in Lederman Science Center

3. Public Display

Sources

PQN

- Current PQN source polarization-based
- Bulk optics
- ~18k without laser/detection/time tagging electronics



Fermilab

- All Fermilab sources time-bin?
- Fiber-pigtailed Waveguide

Sources

- Possibly do something in-between
 - Polarization entanglement
 - Waveguide fiber pig-tailed (all fiber coupled for easier setup/maintainance)
- We could use same waveguides as current sources to allow for easier interfacing
- Fiber-based Sagnac Loop

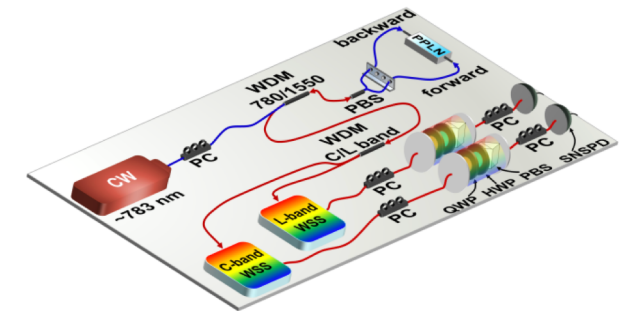


FIG. 1. Experimental setup. Blue lines: polarization-maintaining fiber. Red lines: non-polarization-maintaining fiber. CW: continuous-wave tunable laser. PC: fiber polarization controller. WDM: wavelength division multiplexer. PPLN: periodically poled lithium niobate waveguide. WSS: wavelength-selective switch. PBS: polarizing beamsplitter. HWP: half-wave plate. QWP: quarter-wave plate. SNSPD: superconducting nanowire single-photon detector.

Measurement System

- QWP, HWP, PBS, and coupling optics
- QWP and HWP have to be motorized
 - Working on custom motorized stages for this to improve speed/reduce size
- We are trying to reduce the footprint of the device and make it easier to keep in a network closet



Public Display

- Will need to work with Ketevan and Luis to see how to incorporate our current display into the current layout of the Lederman Science Center
- Currently working on getting IRB approval for collecting user statistics
- Improving display at TUFL as well
 - More accessible/interactive