

# BAND Laser System Safety Training (SAF158)

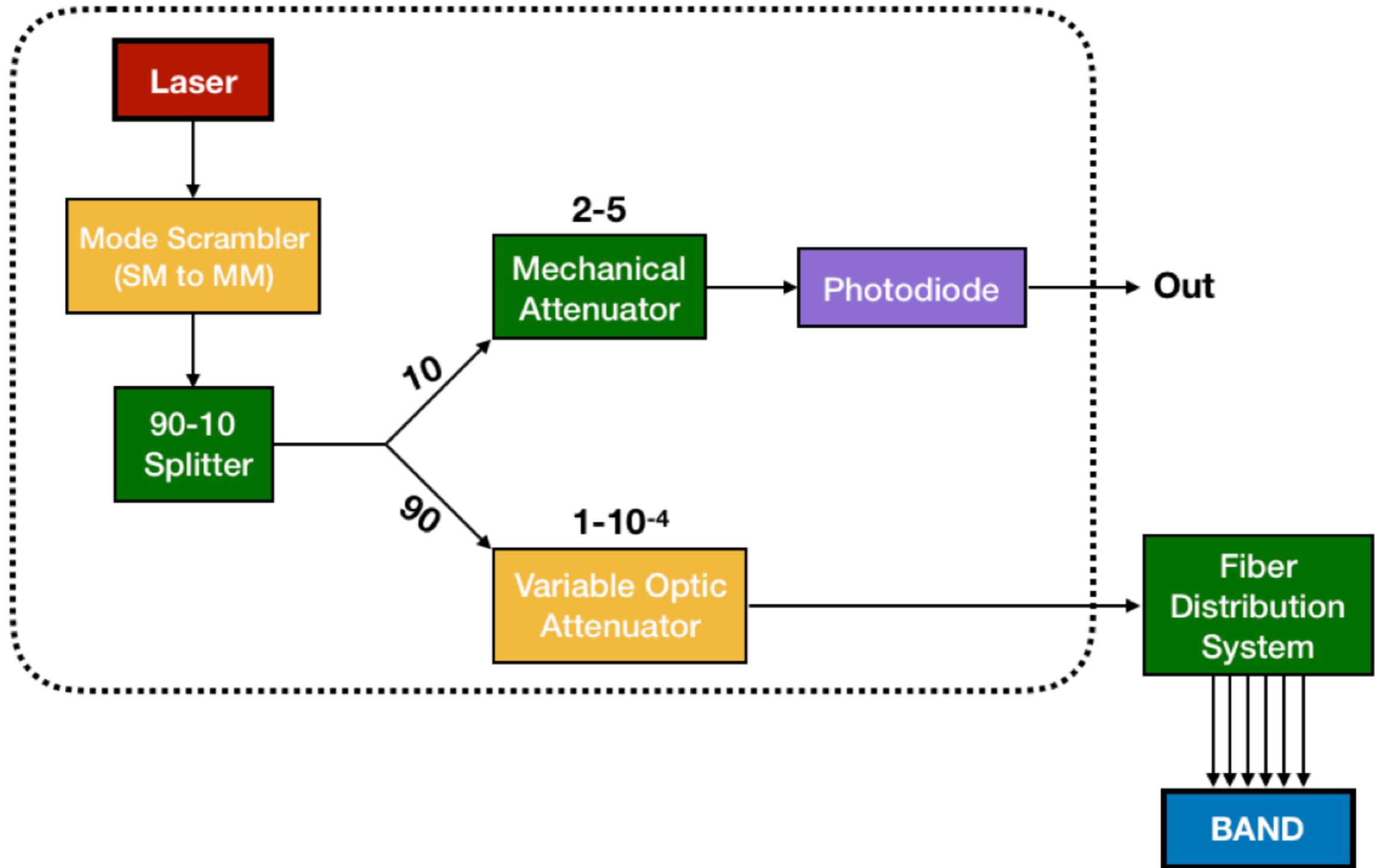
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# BAND Laser System

- Located in Hall B
- Part of the BAND detector
- Used for calibration of the BAND detector
- Light-tight box in racks left of the upstream beam-pipe (before the target):
  - 355 nm picosecond diode laser (class 3B)
  - Computer controlled laser driver, signal generator and variable optic attenuator
  - Mode scrambler and mechanical attenuator
  - Reference photodiode
  - Raspberry Pi
- Interlock safety box
- Fiber distribution system next to BAND
- Low Voltage Power supply
- **Connections are all fiber-based (no free optical paths)**

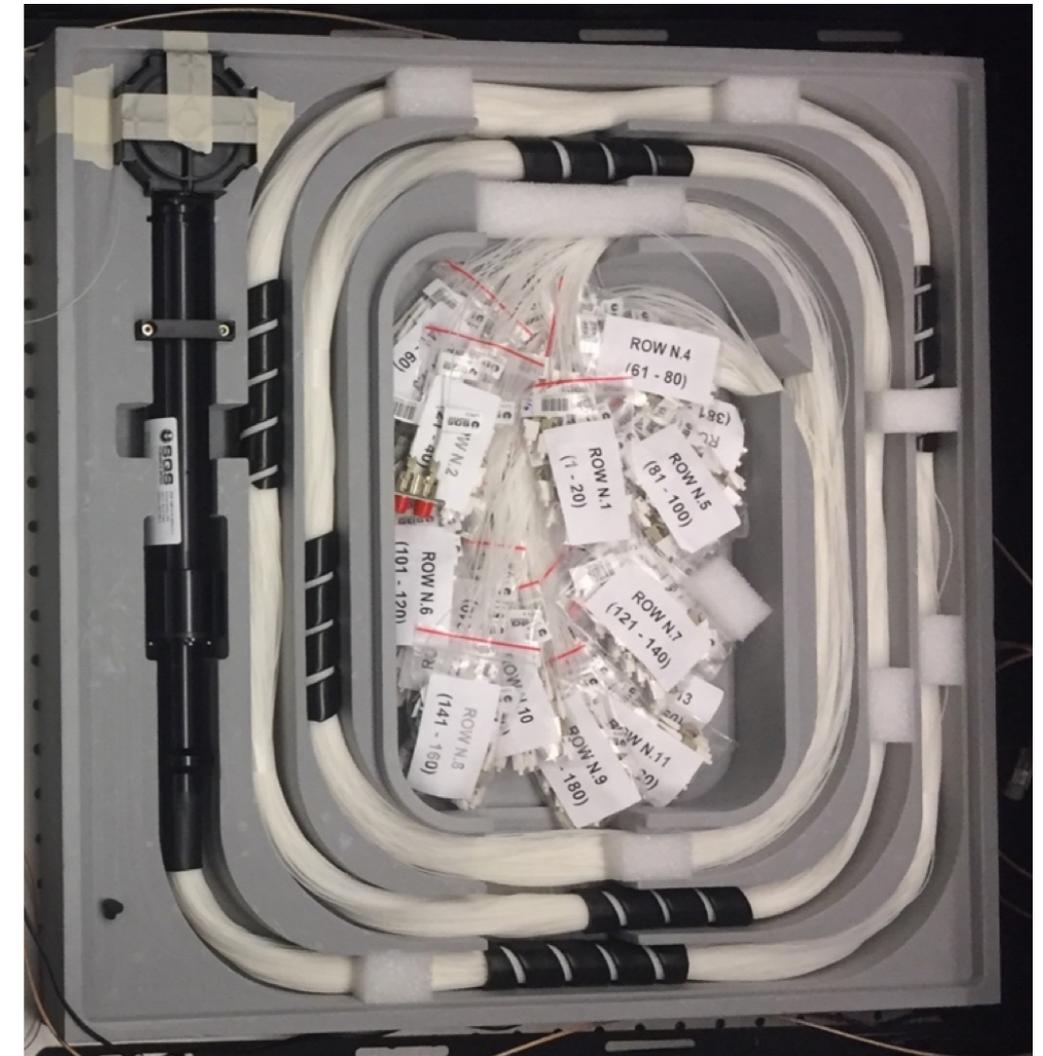
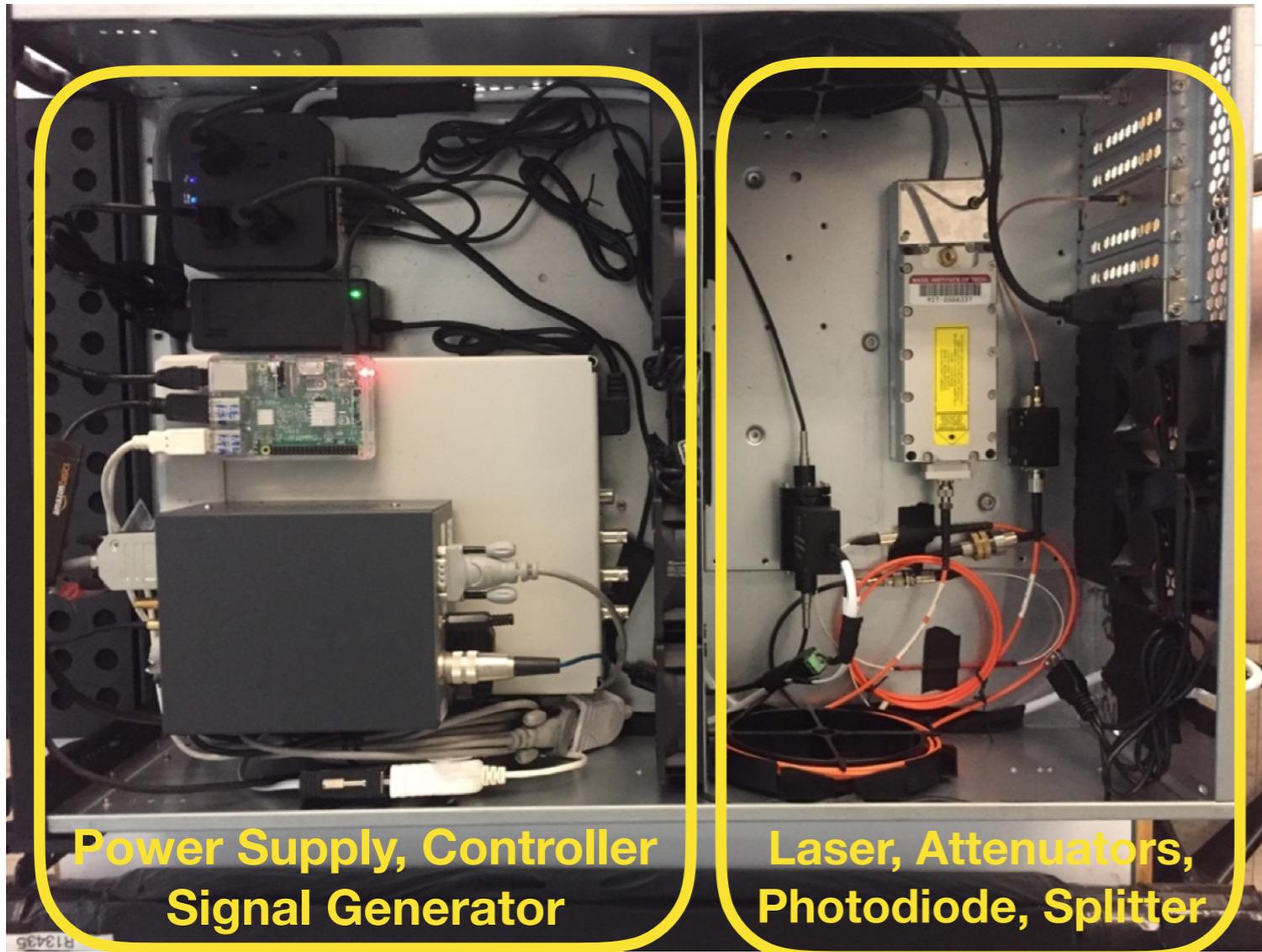
# BAND Laser System: Schematics



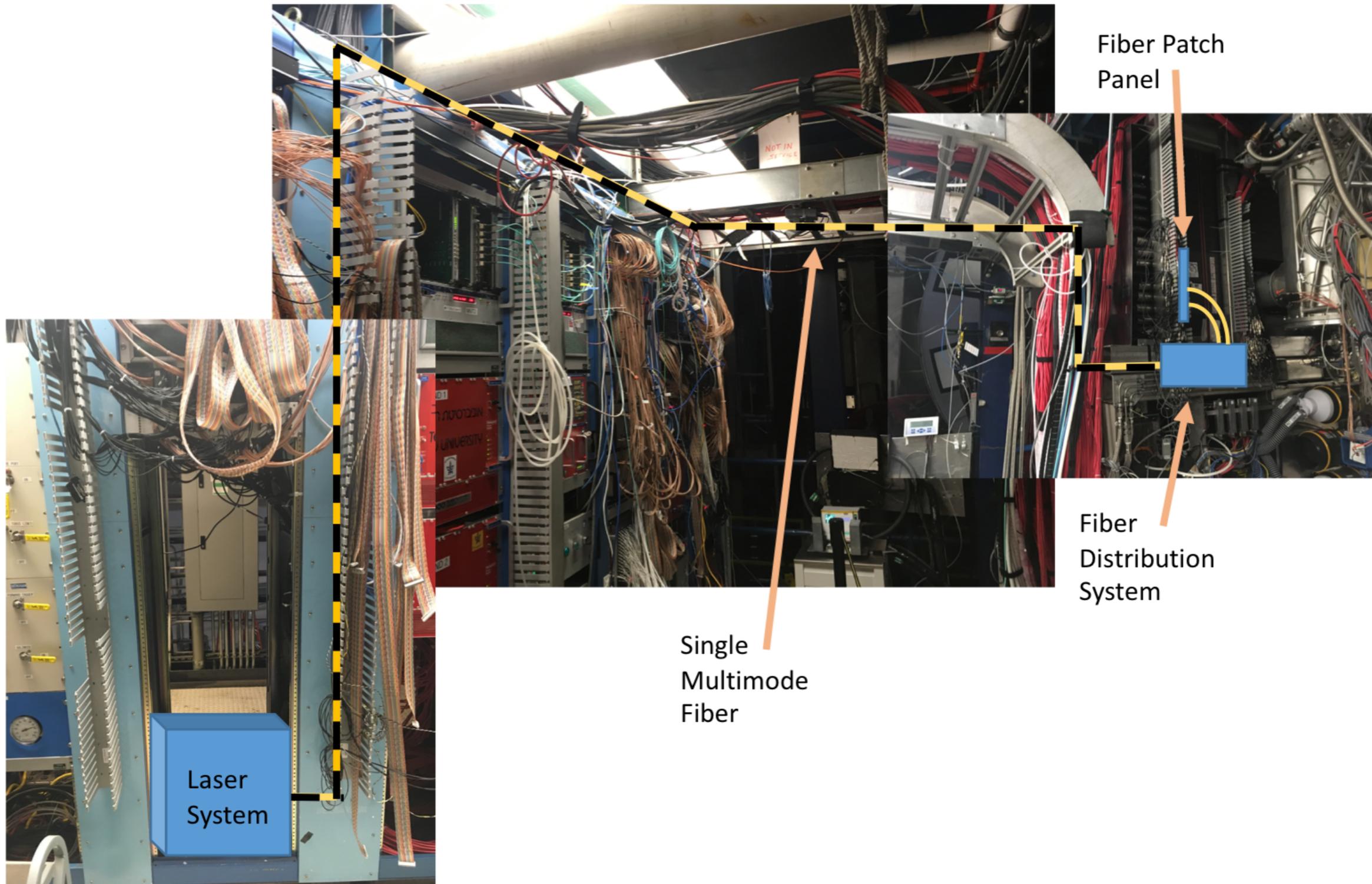
# BAND Laser System Components

**Box with Laser components and controllers**

**Fiber Distribution System**



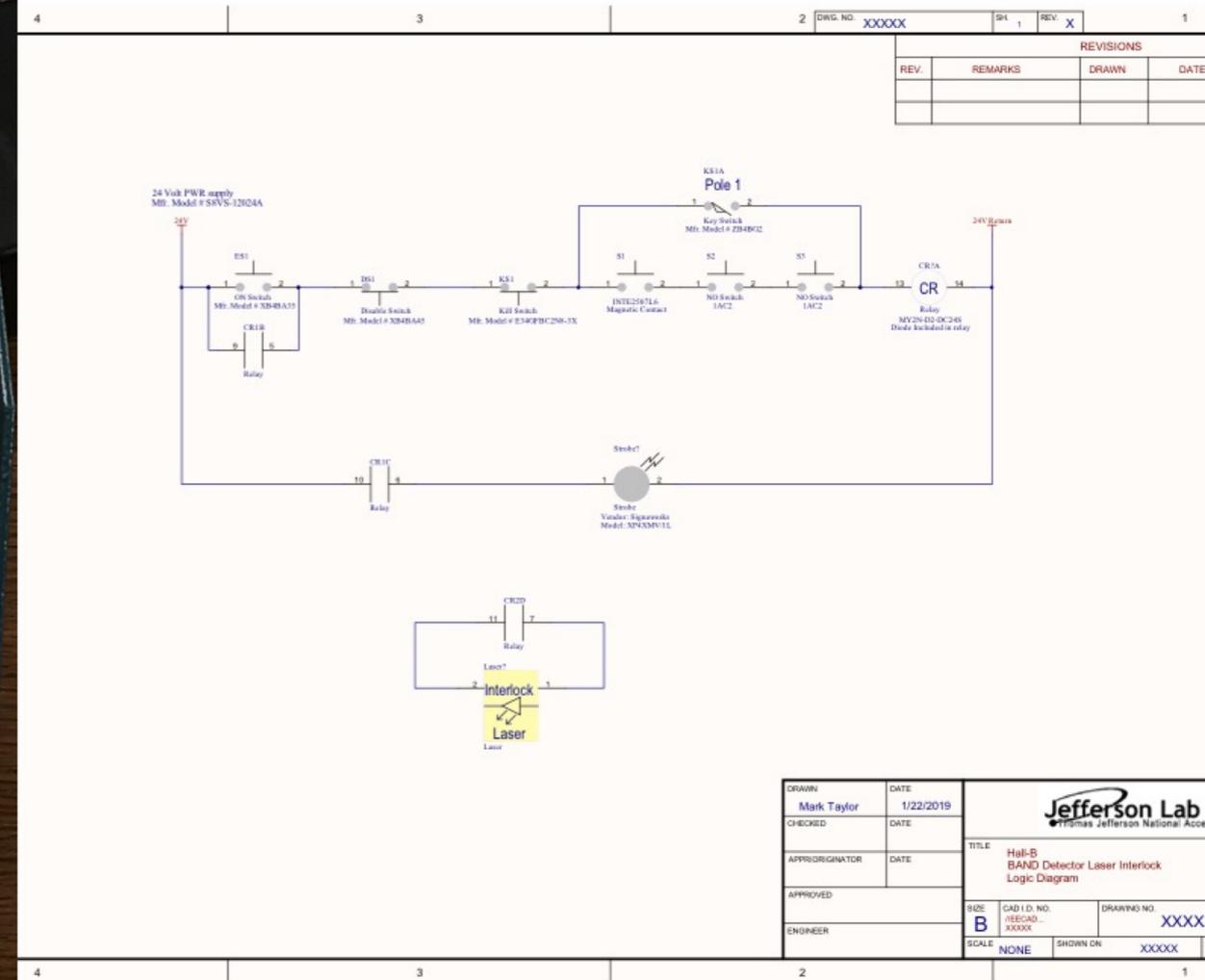
# Light Distribution in the hall



# Interlock Box



## Schematics of interlock



# Laser Types and Ratings

- **Laser hazard are classified based on**
  - the wavelength of the emitted radiation
  - the source of the laser radiation exposure
  - the duration of exposure
  - the laser power
  - the hazard potential
- **Laser classes**
  - Class 1: very low-power laser that cannot emit radiation at hazard levels under normal operating conditions
  - Class 2: low-power visible light lasers with insufficient power to cause eye damage within the standard operating conditions. Direct viewing of the beam without blinking can cause injury
  - Class 3A: medium-power lasers which can cause injury by direct viewing of the beam
  - **Class 3B: medium-power lasers that present a direct or indirect viewing hazard that can cause eye injury**
  - Class 4: high-power lasers that present a direct or indirect viewing hazard to the eye, also possible skin hazard and fire hazard

# Laser Beam Hazard Avoidance

- Class 3B laser light is guided in fiber only
- Closed box and the laser system are rated as a class 1 system with an operational interlock
- Interlock to prevent operation when the light-tight box is open
- Warning labels, signs and signals (**beacon on interlock box is on during operation**)



# Requirements for Laser Use

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The laser may only be operated by personnel who have completed the following requirements

- Completed the laser safety course SAF1140
- Read the laser safety chapter of the EH&S manual (6410)
- Completed the BAND laser system safety course SAF158
- Read the BAND laser LSOP
- Completed the proper medical certification through JLab Medical Services
- Signed the list of authorized users/operators of the LSOP
- Toured the laser stand with the LSS

# Summary

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- Overview over the BAND laser system for the calibration of the BAND detector
- Laser types and hazards
- Avoidance of the laser hazard
- Requirements to use the BAND laser system

## **Important Notes:**

- **Familiarize yourself with all aspects of the laser safety and communicate with the HallB LSS if you have any questions or concerns**
- **Follow all safety instructions and comply with all safety regulations i.e. never unplug fibers with the laser system on**
- **You are responsible for your own protection and the safety of others**