

BAND Laser System Safety Training (SAF158b)

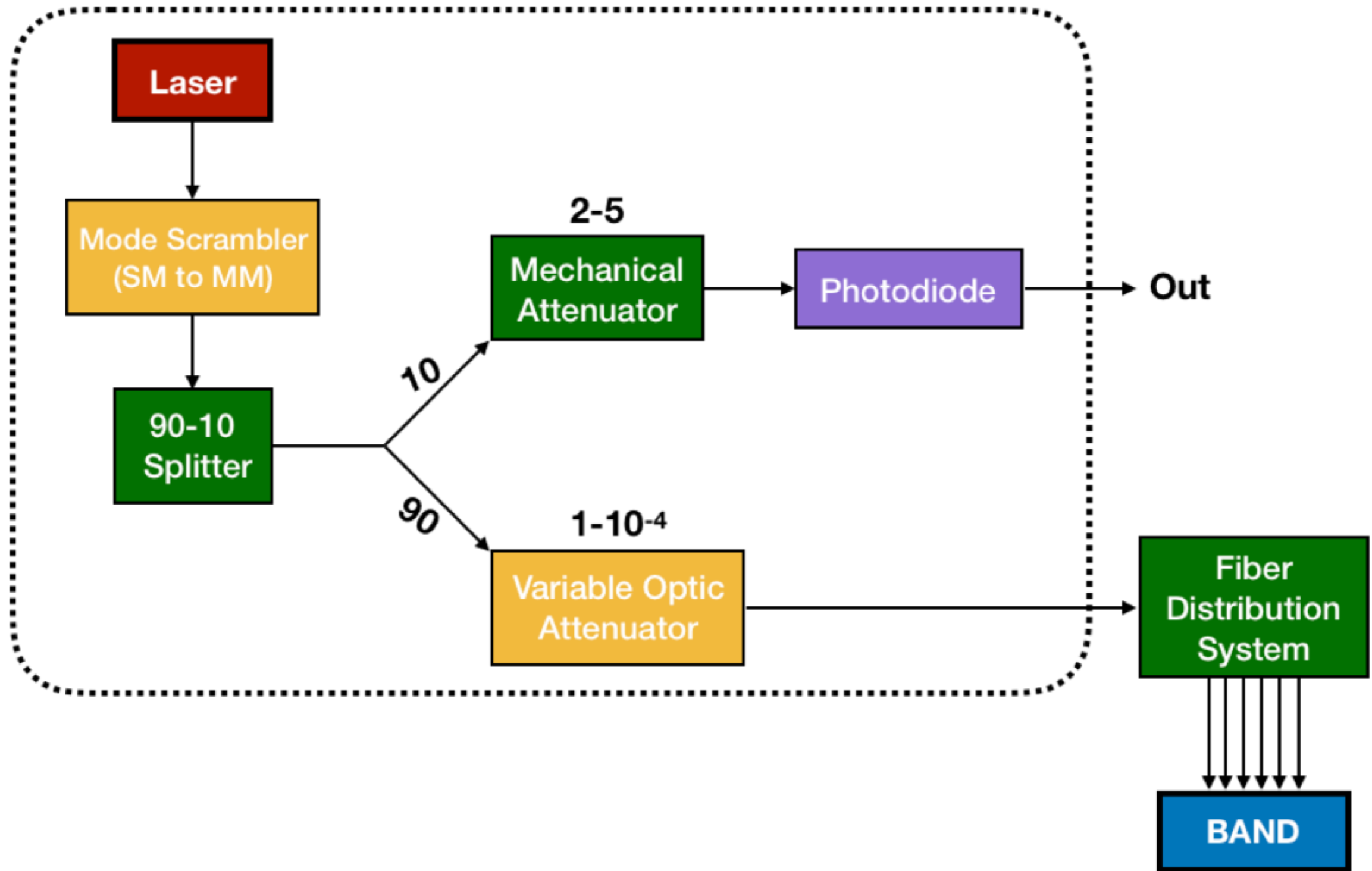
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A horizontal blue brushstroke line spanning the width of the slide, located at the bottom.

BAND Laser System

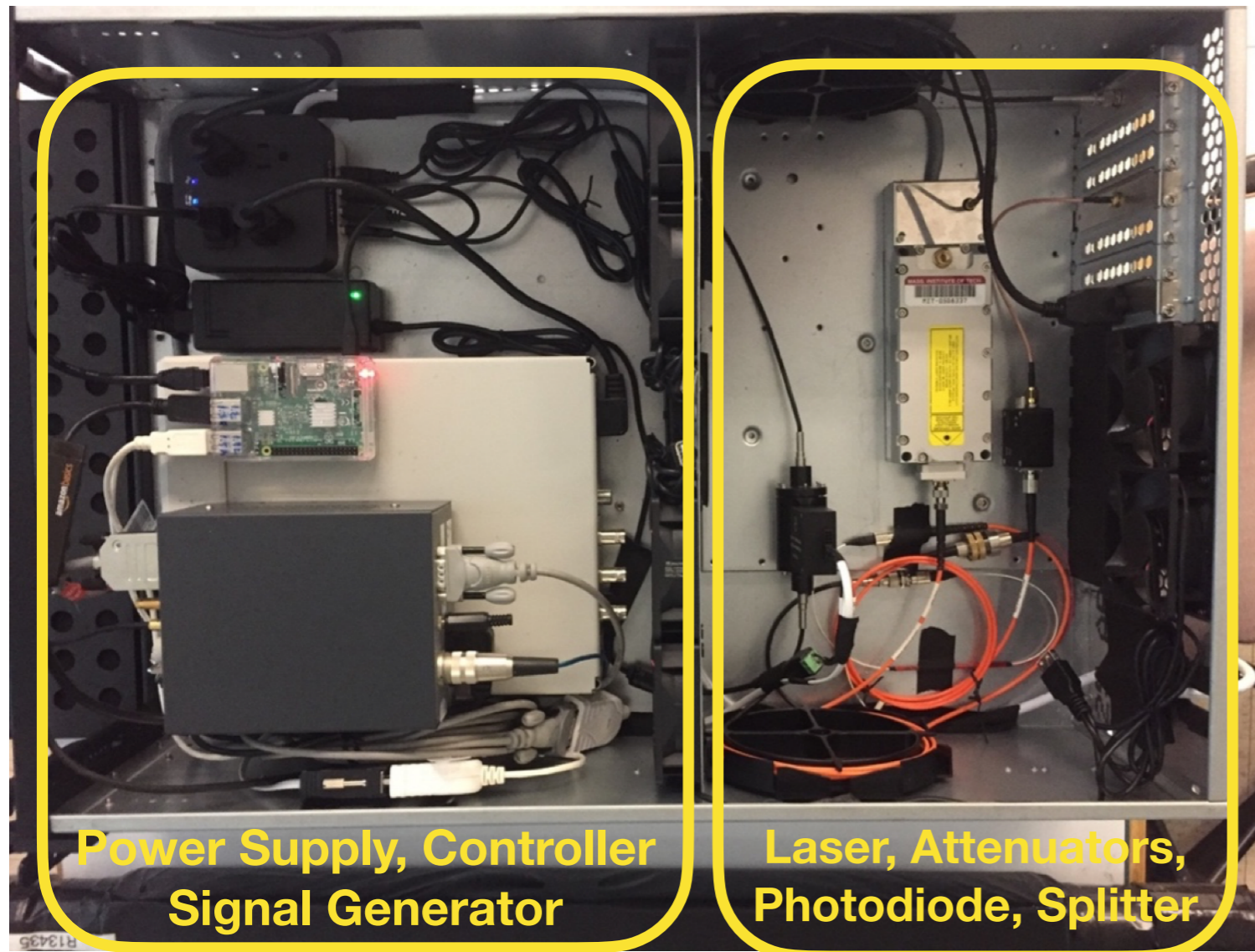
- Located in Hall B
- Part of the BAND detector
- Used for calibration of the BAND detector
- Light-tight box in racks left of the upstream beam-pipe (before the target):
 - 355 nm picosecond diode laser (class 3B)
 - Computer controlled laser driver, signal generator and variable optic attenuator
 - 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



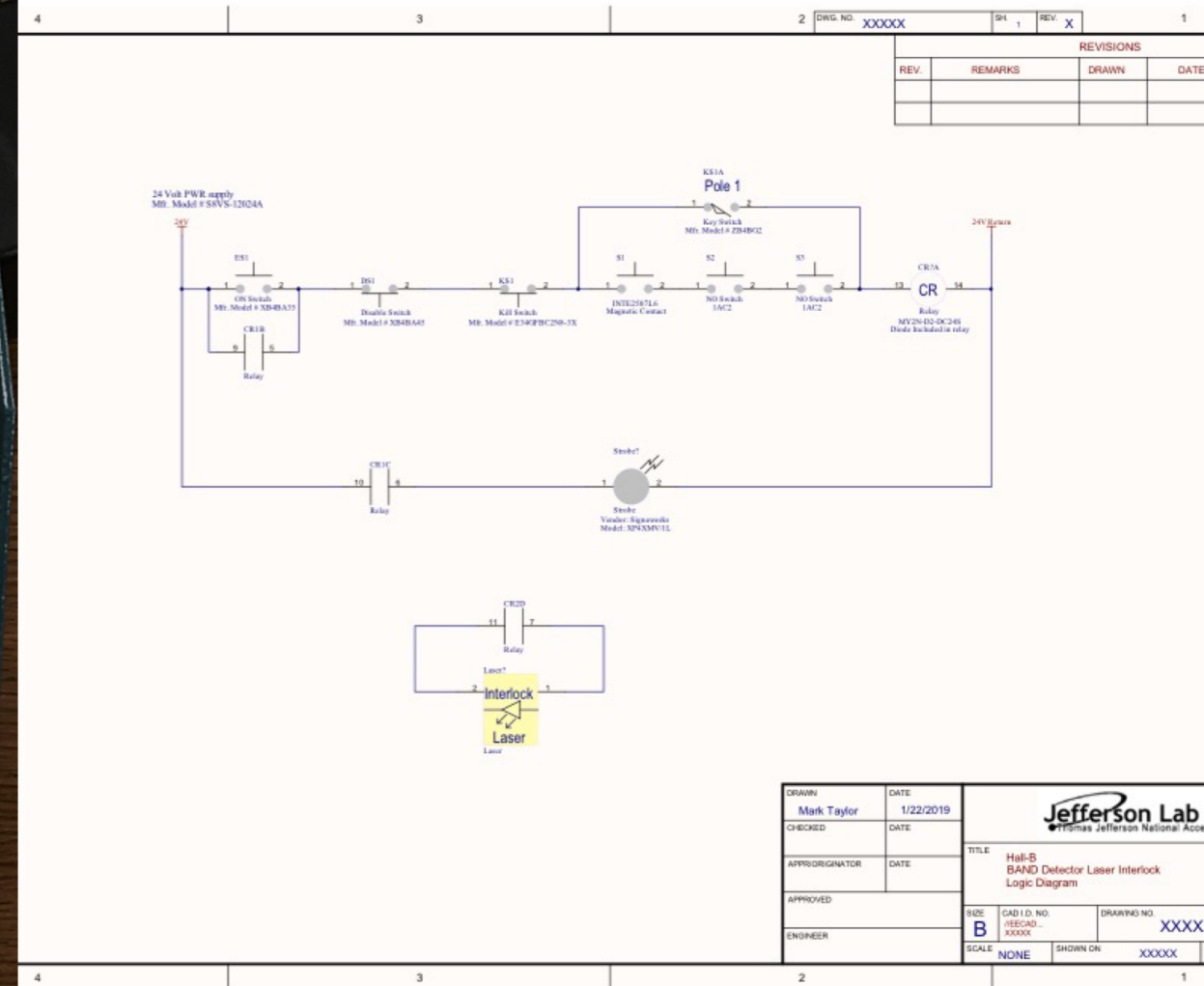
Light Distribution in the hall



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

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 SAF158b
- Read the BAND laser LOP
- Completed the proper medical certification through JLab Medical Services
- Toured the laser stand with the LSS
- Signed the EPAS

Summary

- 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**

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