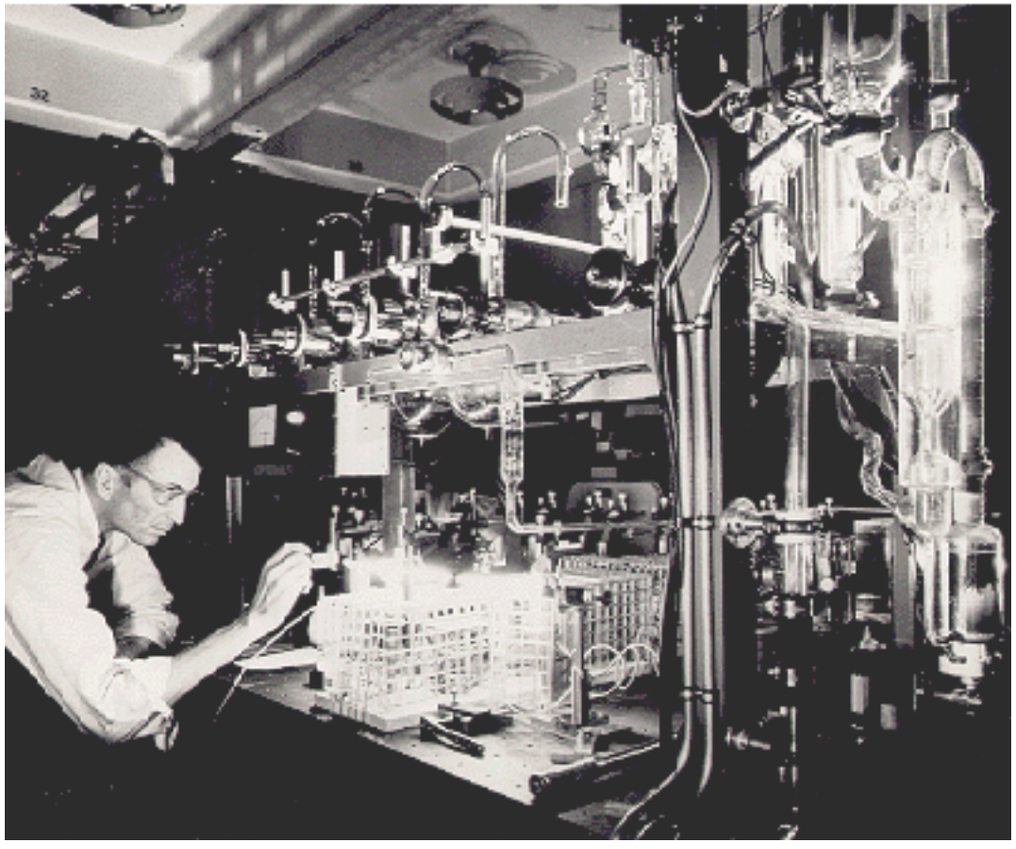
Characterization of BCM1F Lasers

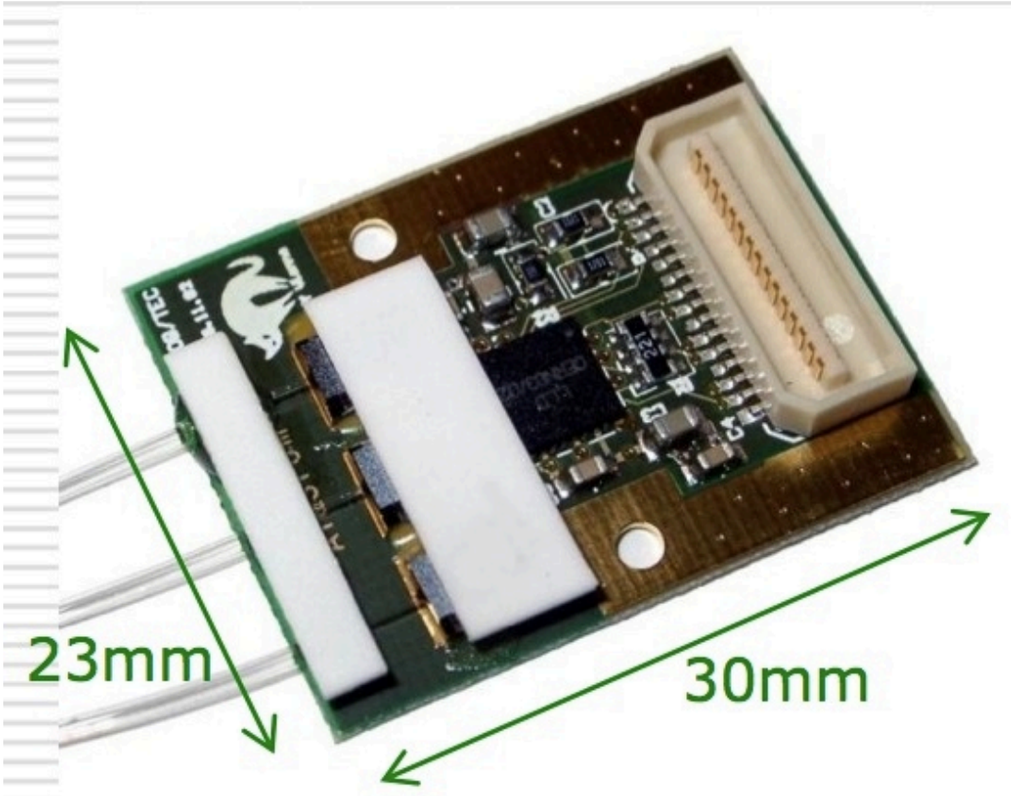


Brian Pollack, Northwestern University, BRM Group

Overview

- **Analog Opto-Hybrids**
- **PLT Go/NoGo Tests**
- **BCM1F Laser Characterization**
  - Completed Items
  - ToDo
- **Timeline**

Analog Opto-Hybrids



- ★ **Optical Links used for data transmission**
- ★ **High bandwidth, low power, low noise**
- ★ **We intend to use 16 AOHs (48 channels, 3 lasers per AOH)**
- ★ **Must characterize laser response for accurate calibration**

PLT Tests

- **30x3 PLT analog opto-hybrid (AOH) lasers were tested for functionality (Go/NoGo tests)**
- **Results: <u>All Go</u> (PLT group can sleep easy tonight)**

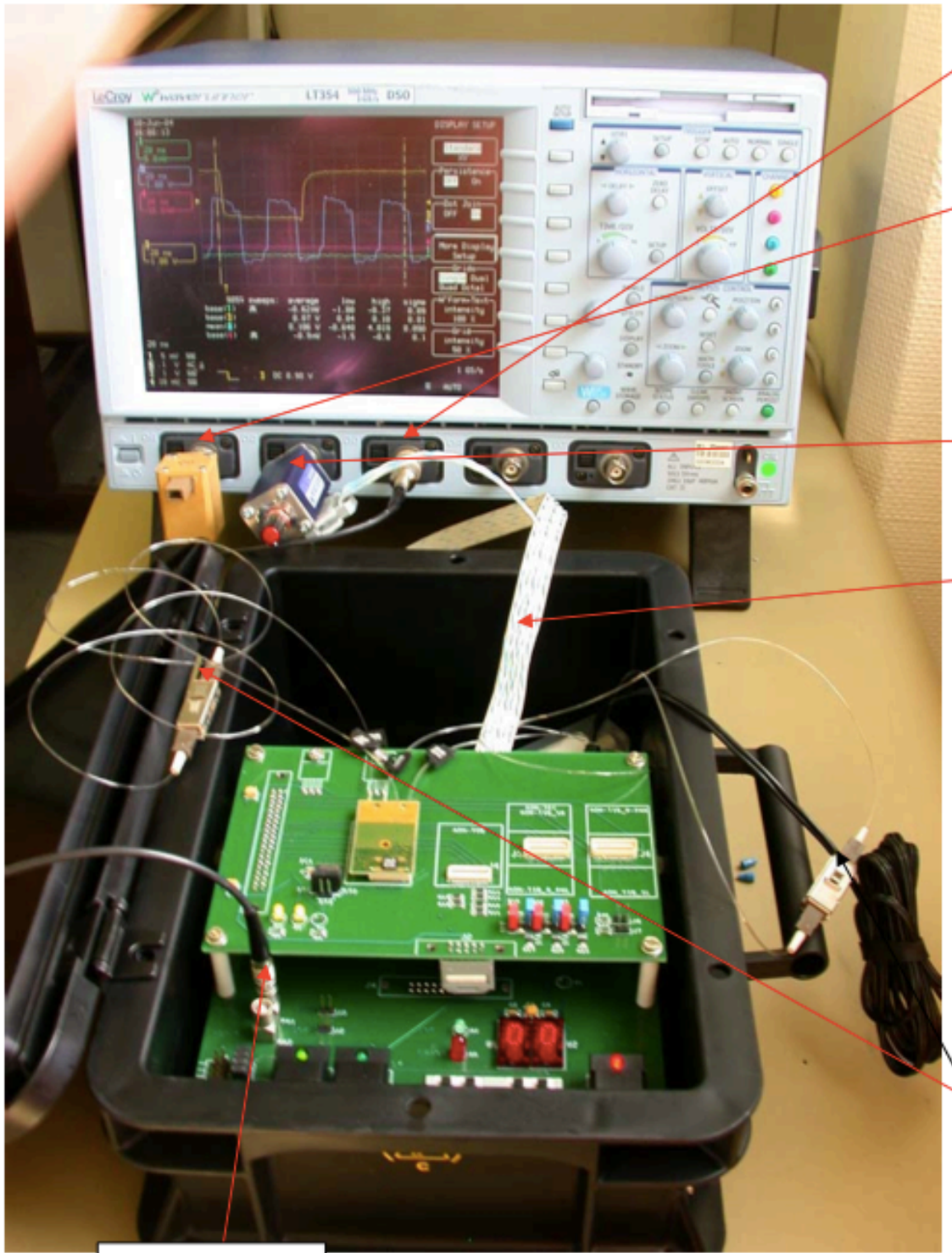
BCM1F Laser Characterization

- **Plan Of Attack**
  - All BCM1F AOH lasers will be tested to determine laser output as a function of input voltage
  - Input voltage will vary from sub-mip level to ~10% below maximum design value
  - Tests will be conducted at 4 gain levels for each laser
  - After lasers are characterized, we choose the 16 that have the most similar response curve and activation threshold
  - Further tests will be conducted at low temperature
    - It is hypothesized that the laser response will be non-linear as a function of temp

Hardware/Software

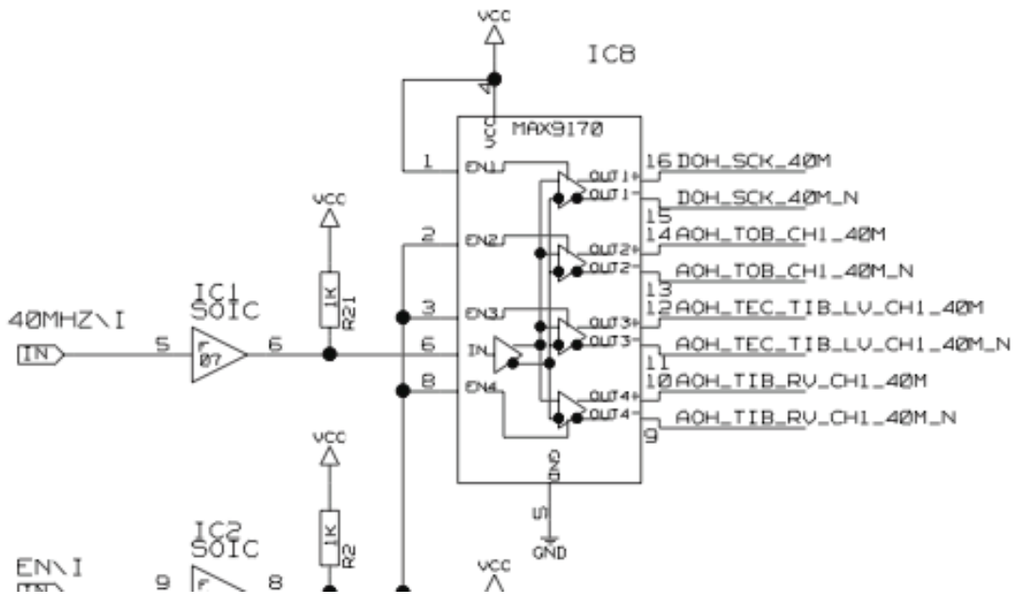
- **Analysis hardware (frequency generator, oscilloscopes, macbook) and software programs (matlab) are ready and working**
- **Once tests commence, routine will be automized and should produce results quickly and accurately**

Test Box


Syn. cable
Optical head
LVDS probe
LVDS cable
MU-MU connectors
Trigger Output

Final Issues

Analog In (GOOD)



Digital Out (BAD)

- ★ **The PLT AOH Test Box requires some modification before the full suite of tests can begin**
- ★ **The default setup uses an internal trigger as a digital input signal**
- ★ **Currently working with Alan Bell And Vladimir Ryjov to modify the box to accept input from frequency generator and transmit and analog signal to the AOH**
- ★ **Setup should be ready soon after the conference**

Timeline

	Fall 2012			Winter 2012/13			Spring 2013			Summer 2013			Fa
Activity	1-Sep-12	1-Oct-12	1-Nov-12	1-Dec-12	1-Jan-13	1-Feb-13	1-Mar-13	1-Apr-13	1-May-13	1-Jun-13	1-Jul-13	1-Aug-13	1-S
Removal BCM1F													
Removal of BCM1F beam pipe pixels 25/03-24/05													
Sensors, FE ASICS and Lasers													
sCVD Sensor Order to procurement													
pCVD Sensor Order to procurement													
Metallization													
Sensor Testing, Characterisation													
FE ASIC Design, submission													
FE ASIC + sensor Test Board pcb design & fabrication													
FE ASIC Delivery and tests													
Integration of ASIC to sensor and source tests on test pcb													
Laser test setup and characterization													

Everything is on schedule!