Opto-Board for O.S.U. Rad-Hard Optical TX/RX ASIC Chips

- Miniature optical transceiver board
  - thick film circuitry on Beryllium Oxide substrate
  - 14 electrical, dielectric, resistor, and mechanical layers
- Opto-Board ASICs and optical components proven to tolerate radiation doses up to 30 MRad
Houses OSU ASICs and associated optical devices

- DORIC - Digital Optical Receiver Integrated Circuit
- VDC - VCSEL Driver Chip
  - Both done in IBM .25μm CMOS
- 8 channel VCSEL arrays
- 8 channel PIN diode array
  - Custom packaging developed by Taiwanese collaborators
Opto-Board Prototypes

- **Opto-RV1 (FR4)**
  - DMI LL DORI Cs and VDCs
  - OSU 2X VCSEL 1X PIN Arrays

- **Opto-RV2 (FR4)**
  - DMI LL DORI Cs and VDCs
  - OSU 1X VCSEL+3X PIN Arrays

- **Opto-RV3 (FR4)**
  - IBM .25μm DORI Cs and VDCs
  - Taiwan 2X VCSEL 1X PIN Arrays
Opto-Board Prototypes Continued

- Opto-RV4 (FR4)
- IBM .25μm DORICs and VDCs
- Taiwan 8X VCSEL+8X PIN Arrays

- Opto-BeO1 (BeO)
- IBM .25μm DORICs and VDCs
- Taiwan 8X VCSEL+8X PIN Arrays
Production Opto-Board (BeO)
ASIC Irradiation Data Acquisition System

OSU ASIC

control room circuitry

in beam circuitry

25m
Opto-Board Irradiation Data Acquisition System

Test electronics at OSU before beam test

Opto-boards

Rad hard optical fibers

25 meter optical fiber

Stage moves 25m to reach proton beam
VCSELs are damaged during irradiation but can recover through annealing.