GBT-FPGA Interface

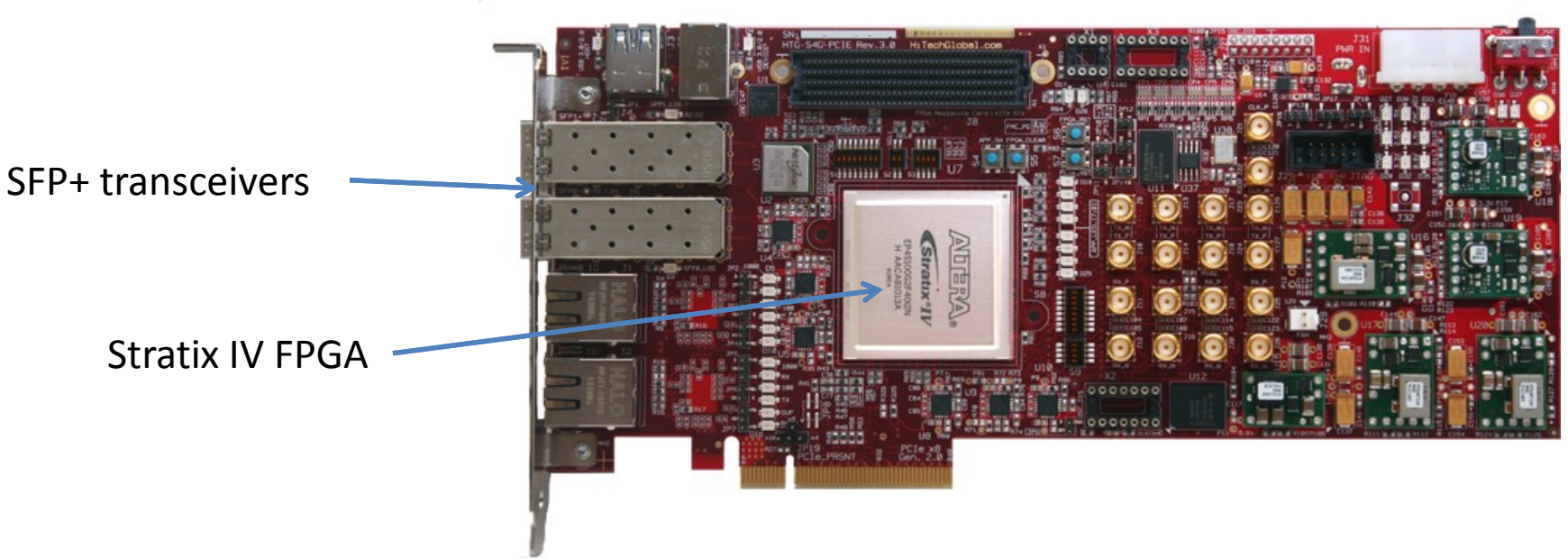
Carson Teale

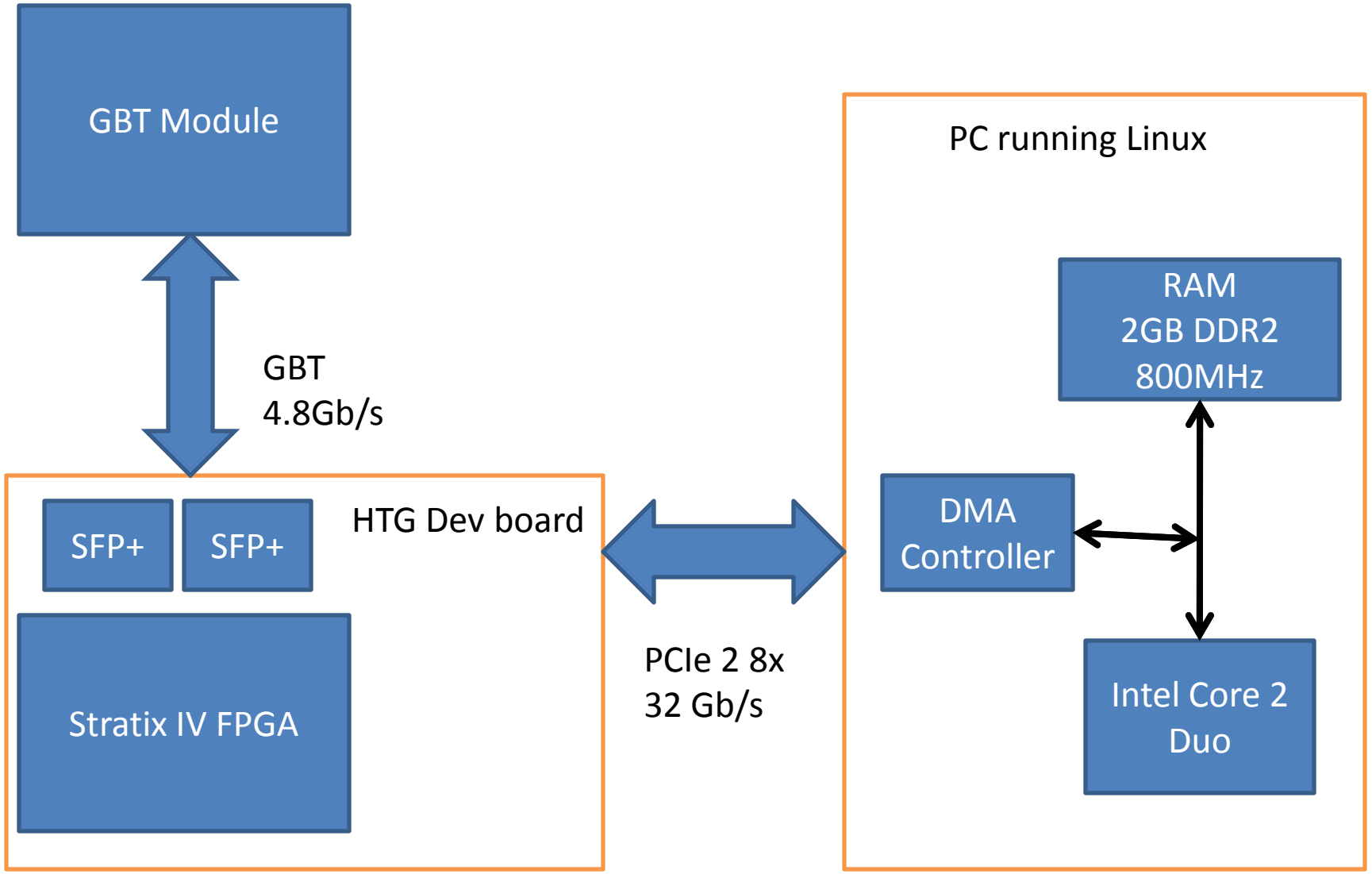
GBT

- New radiation tolerant ASIC for bidirectional 4.8 Gb/s optical links to replace current timing, trigger, and control system of LHC experiments
- Will be proposed for combined transmission of physics data, trigger, timing, fast and slow control and monitoring
- GBT modules located at detectors

FPGA

- Counting room electronics don't need to be radiation hard
- Implement transceiver using commercial FPGA
- High Tech Global board with Altera Stratix IV FPGA and two SFP+ transceivers.




GBT Module
GBT
4.8Gb/s
SFP+
SFP+
HTG Dev board
Stratix IV FPGA
PCIe 2 8x
32 Gb/s
PC running Linux
RAM
2GB DDR2
800MHz
DMA
Controller
Intel Core 2
Duo

What I’ve done so far

- Learned some VHDL
- Simple test VHDL programs to blink LED’s with push buttons on board
- Configured PCI hard IP core
- Learning about Linux drivers

What I need to do

- Modify/write linux DMA driver to allow board to read/write to memory through PCIe bus
- Interface with GBT module using SFP+ transceiver
  - Most FPGA code for this is available through the PH-ESE department
- Run tests to verify speed and accuracy of GBT module