DFB lasers: Mode-hop free tunable DFB lasers do not appear to be available.

Micro mechanically tuned VCSEL: Waiting for response from vendor about frequency noise. We need about 60 MHz ($5 \times 10^{-4}$ nm) stability in bandwidths between 1 Hz (feedback speed) and 10 KHz (PLL speed). The only measurements on the VCSEL are a line width <10 GHz on a spectrum analyzer (probably 1 second integration). They plan to stabilize the laser to 1.25 GHz with a feedback loop. The response time of the laser is ~1 microsecond so this is not a tight constraint either.

The tuning sensitivity is approximately 1nm/V, so the required voltage noise is $5uv/Hz^{1/2}$, not a problem.

The thermal noise is difficult to estimate without a detailed design, but a guess can be made. The tuning element for a 970nm laser of similar design had a stiffness of 50N/M, and a resonant frequency of about 1MHz. Thermal noise is about $1/40eV$, corresponding to a displacement of about 1e-2nm. If we assume a low Q system, this noise would have a bandwidth of 1MHz, so the noise in 10KHz would be on the order of 1e-3nm. This is sufficiently close to our requirement that we cannot make a reliable prediction.

To do:

Measure the temperature stability of the oven using an extra thermocouple and SLC history buffer. The TC should be connected directly to one of the receivers boxes in the oven. (Dorel)

Setup the optical components on the new table. Test the system transmission and optical power levels. (Dorel)

Order the optical power meter. (Dorel)

Continue to set up all of the electronics and the DAQ system. Should be able to test system noise without the optical components. (Dave)

Setup PID loop parameters in the DAQ system, and setup to drive output voltages. Note there are 2 interacting loops. (Laser phase delay, and fiber phase delay). (Dave)