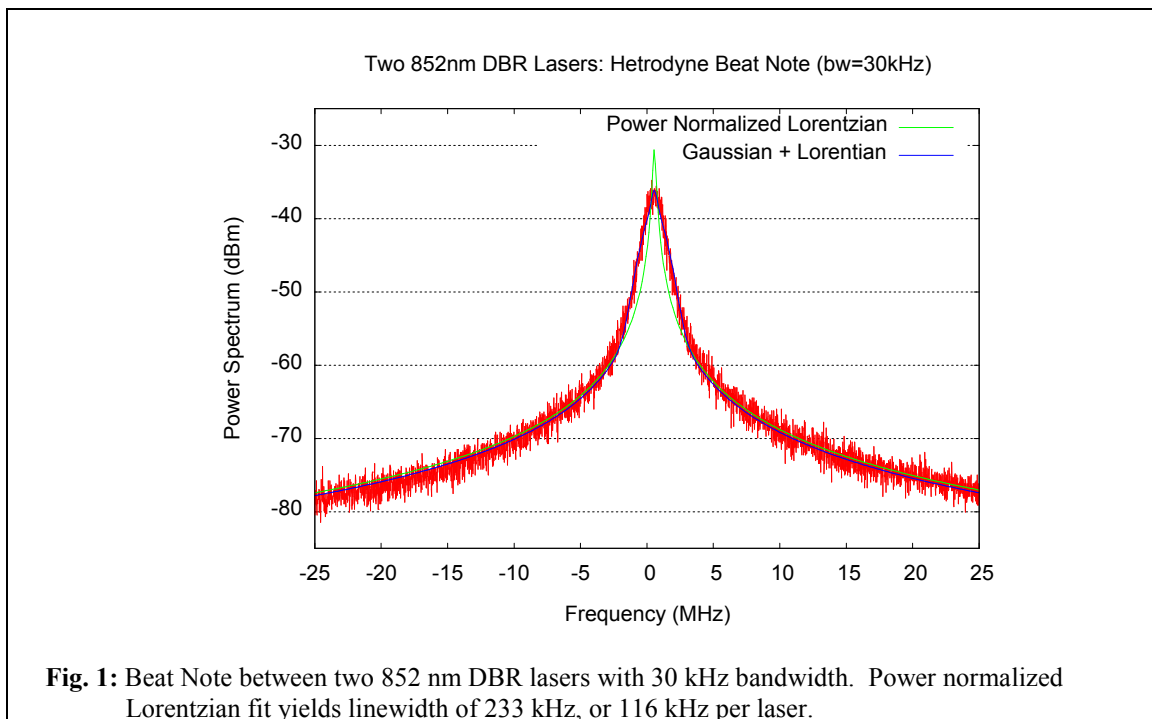


Linewidth and Lifetime Data Measurements of Photodigm's 852 nm DBR Laser Diodes

April 13, 2009

i) Linewidth results

The following evaluation of the spectral linewidth and line shape were performed by B. Luey from Vescent Photonics. Figure 1 to 4 show beat notes between two 852 nm DBR laser diodes fabricated by Photodigm. There is a weak lock (< 10 kHz) to the beat note to keep its center constant, but the lock has bandwidth below the resolution bandwidth of the spectrum analyzer observing the beat note. The bigger frequency spans give more accurate data for measuring the broadband or Lorentzian portion of the laser noise while the smaller frequency scans give more accurate data for measuring the FWHM or 3 dB width of the beat note. Based on the data shown below, the Lorentzian portion of the laser noise is approximately 120 kHz, but the Gaussian noise brings the FWHM of the laser to approximately 600 kHz.



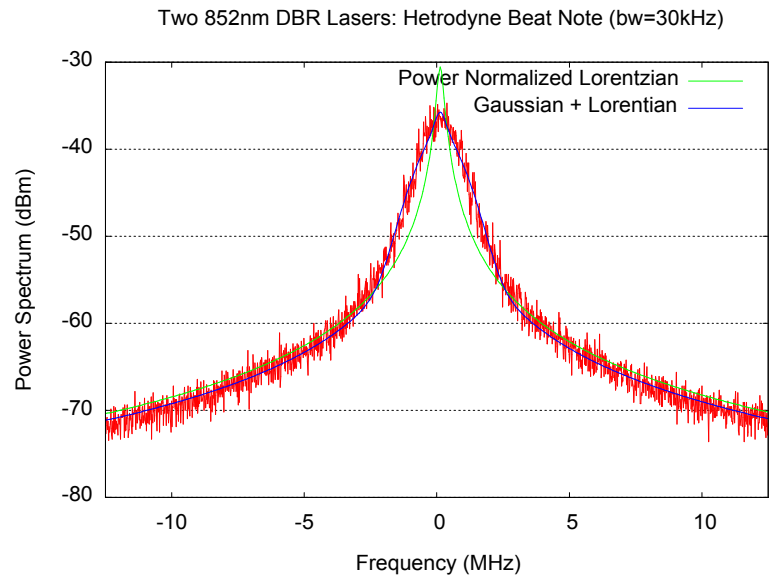


Fig. 2: Beat note between two 852 nm DBR lasers with 30 kHz bandwidth. Power normalized Lorentzian fit yields linewidth of 260 kHz, or 130 kHz per laser. The 3 dB width is 850 kHz or 425 kHz per laser.

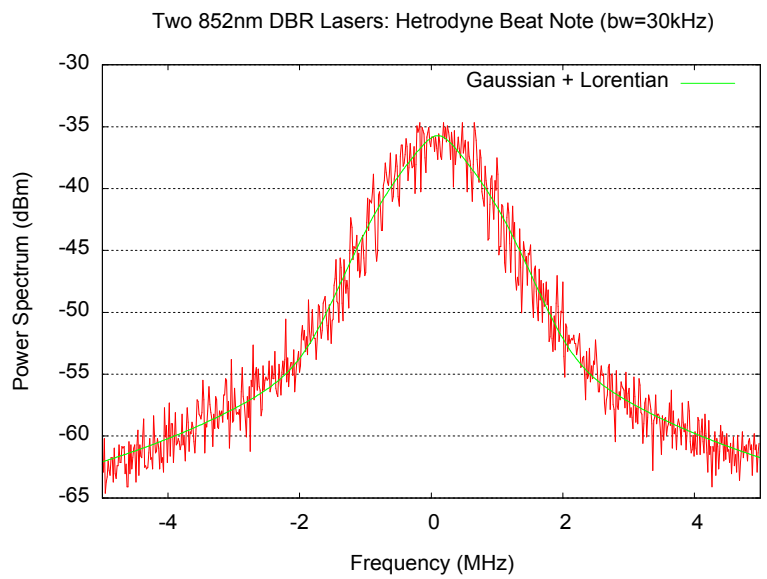
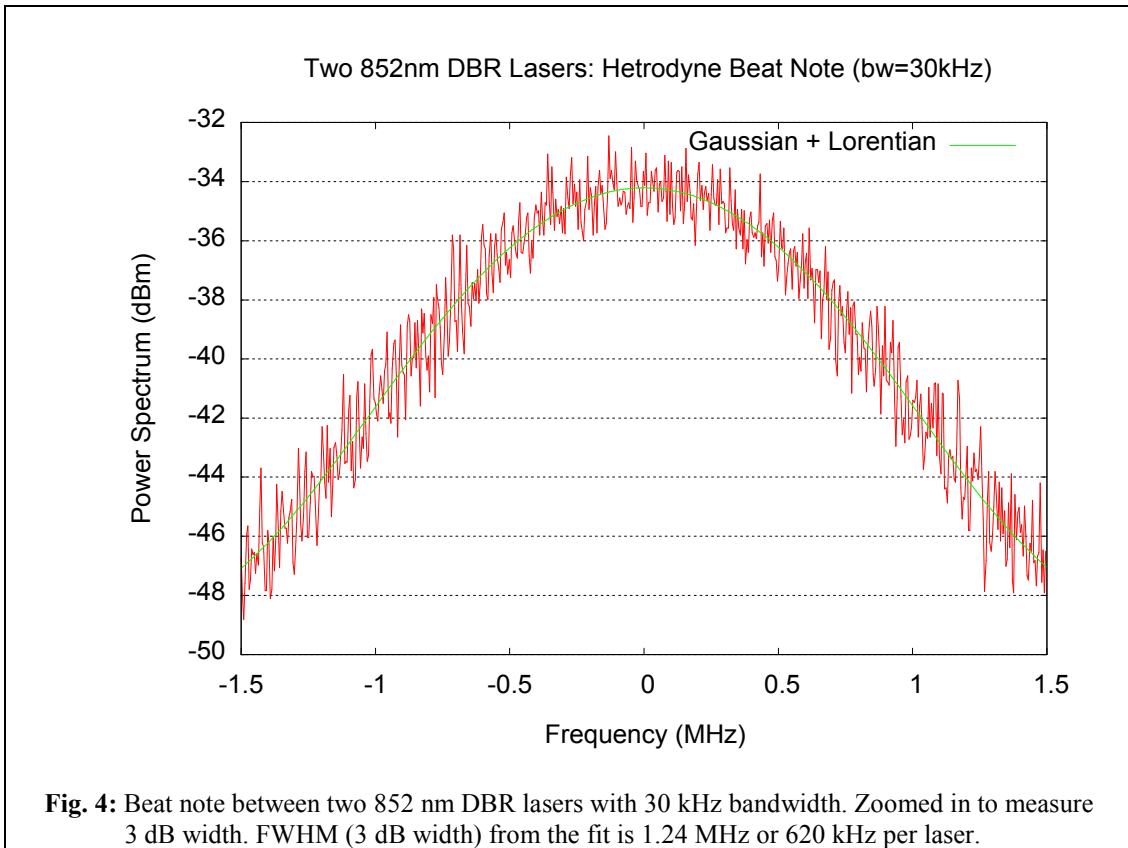


Fig. 3: Beat note between two 852 nm DBR lasers with 30 kHz bandwidth. The 3 dB width from the fit is 1.1 MHz or 560 kHz per laser.



ii) Preliminary lifetime data

Six DBR laser diodes from the same lot were chosen for lifetime measurements. The diodes are running in a constant power mode at 100 mW at three different temperatures. Two diodes are running at 25°C, two at 45°C and two at 65°C, respectively. At the time this report is written the diodes have passed 700 hours of continuous operation and did not show any anomalous behavior. However, the passed time is not sufficient to derive reliable mean-time-to-fail values. Further testing is required. Figure 5 shows the temporal behavior of the injection current over time for each of the diodes.

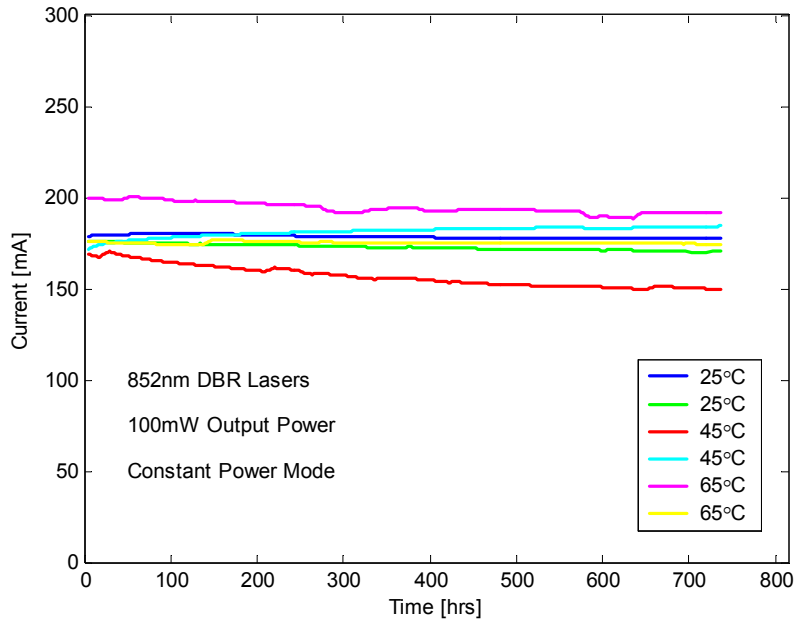


Fig. 5: Preliminary lifetime data of six 852 nm DBR laser diodes. The diodes are running in a constant power mode at three different temperatures indicated in the legend.