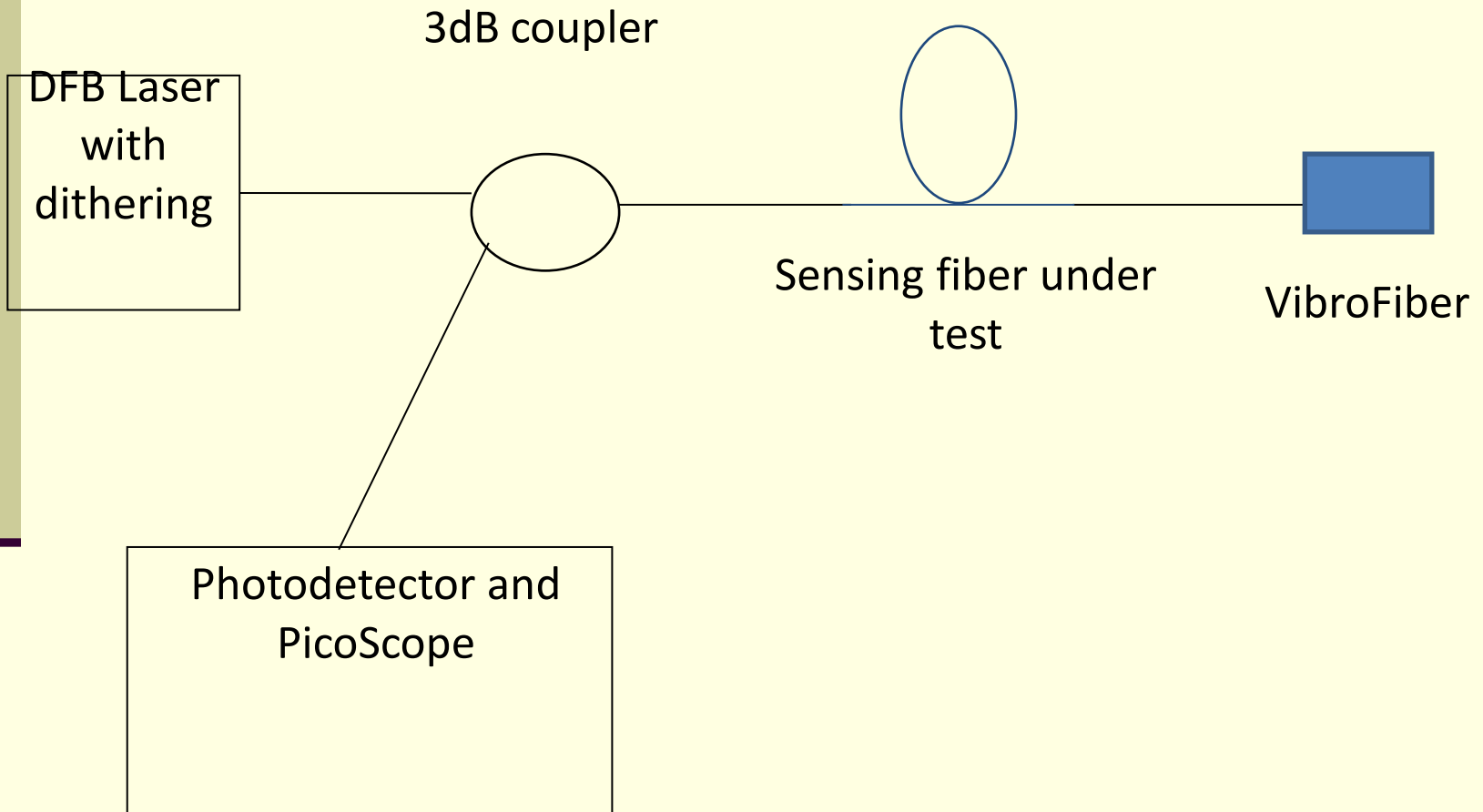


Long Gauge VibroFibre

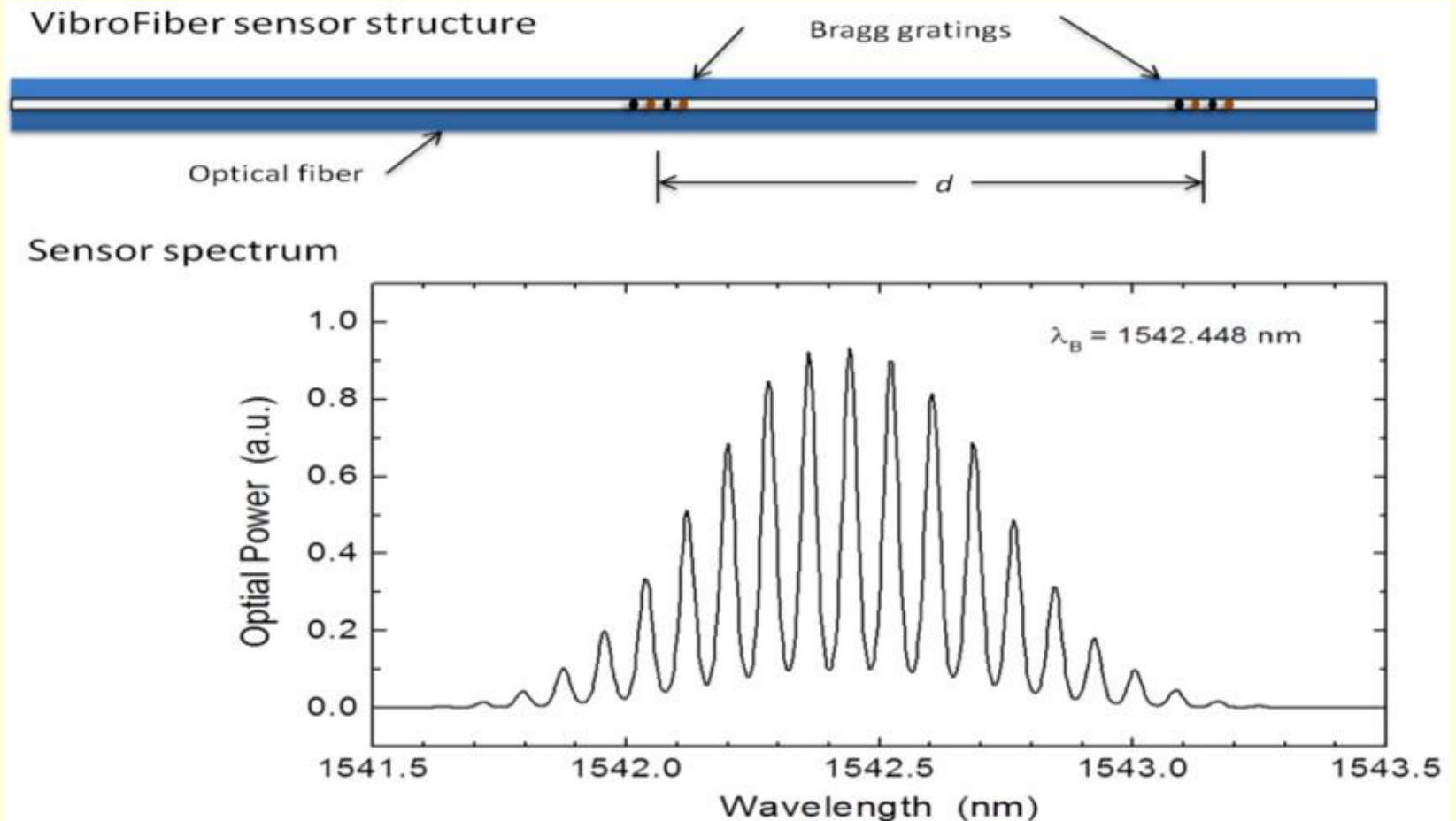
Photonics North May 29th 2014

By Peter Kung QPS

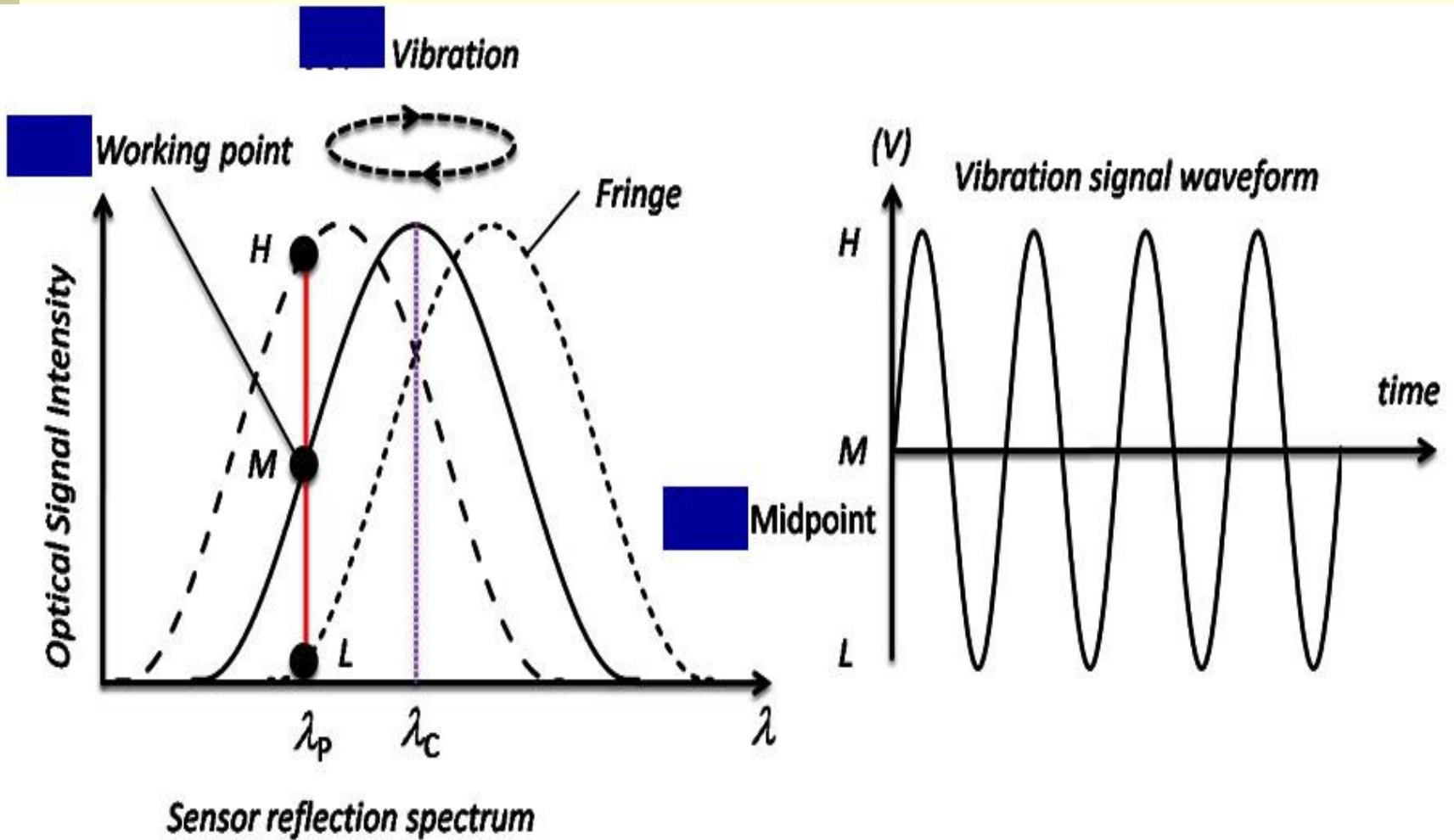
Long Gauge VibroFibre



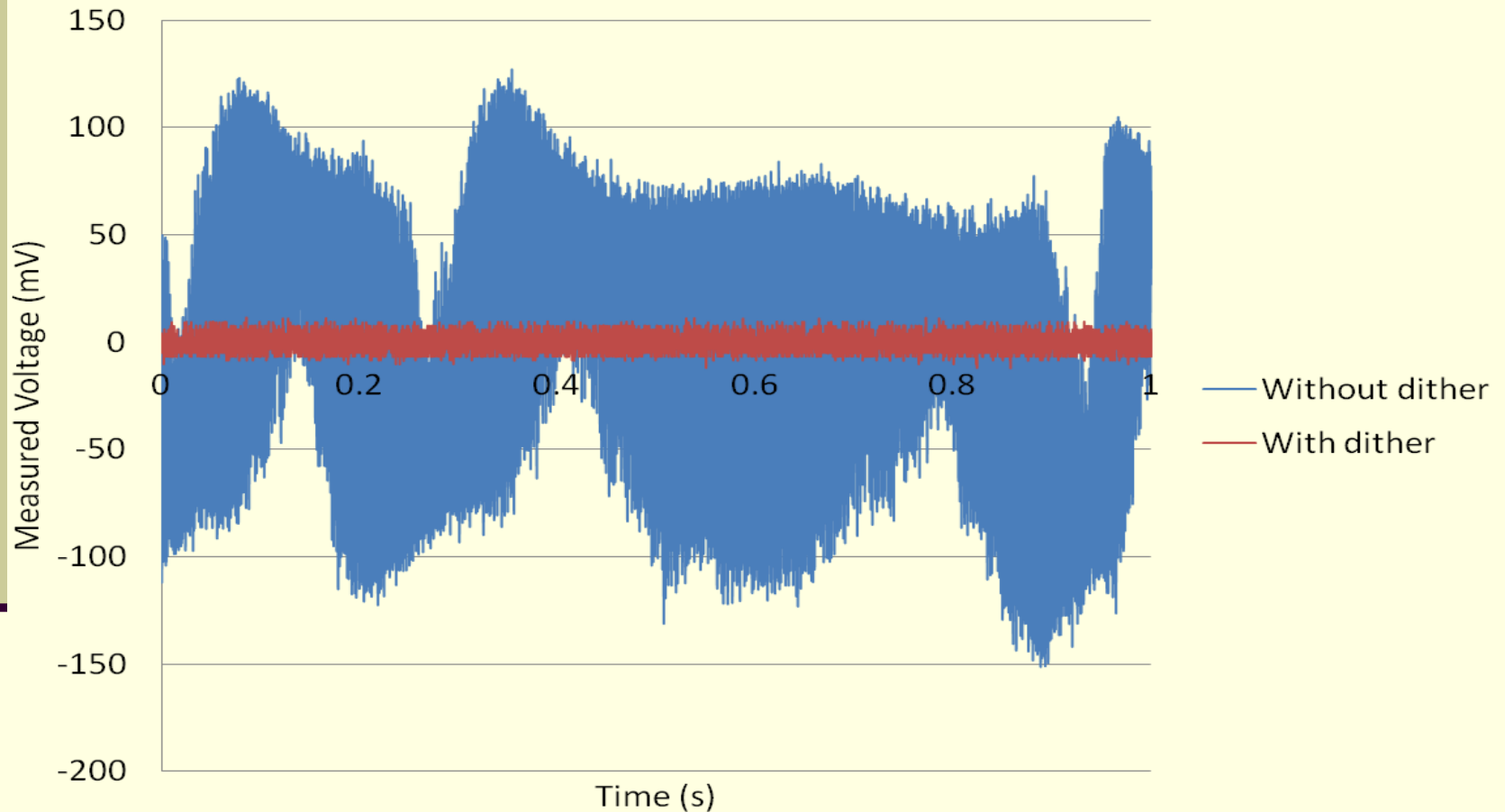
VibroFibre structure



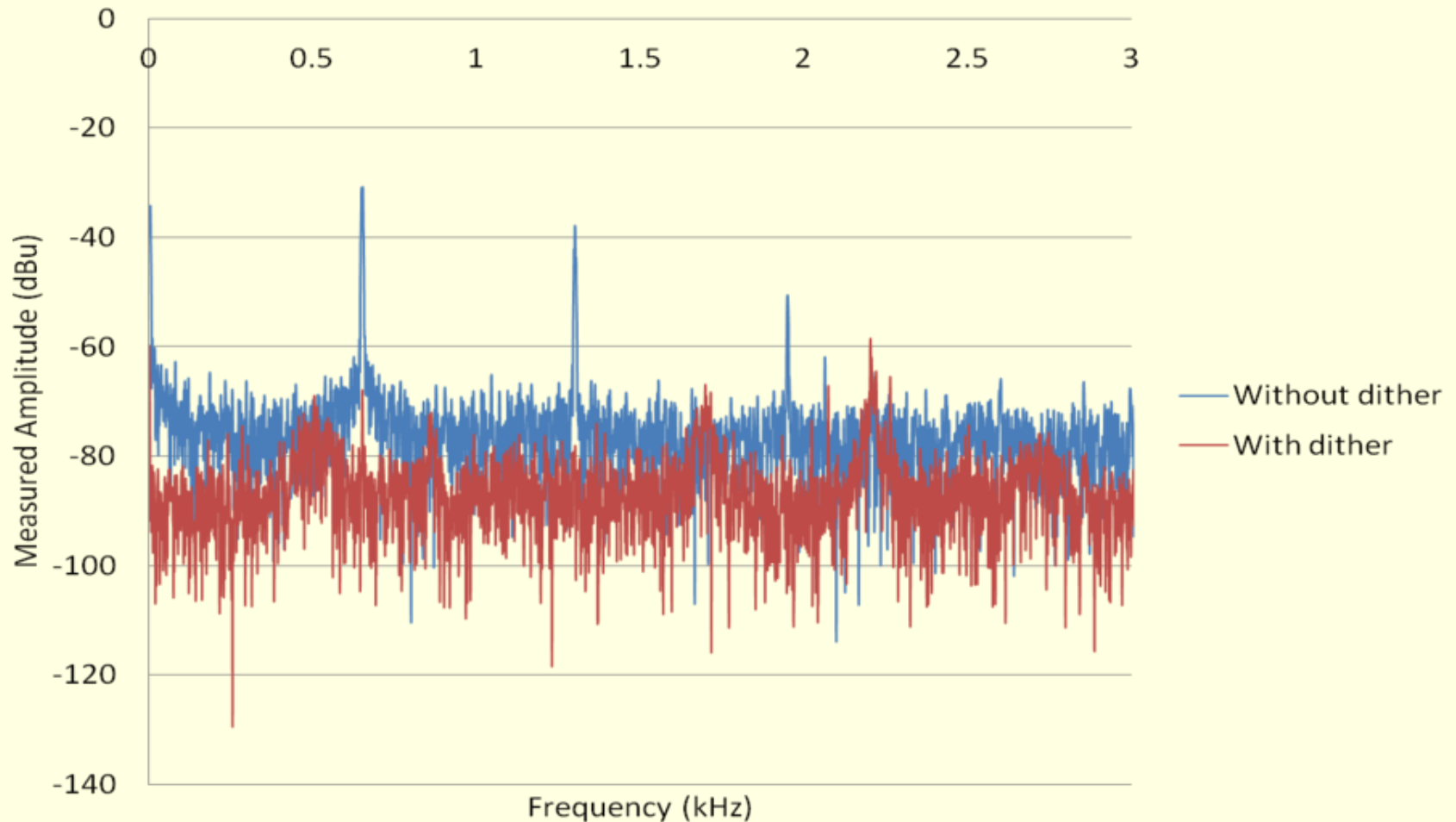
How it works



It is from interference if multiple optical reflection, integrated with cable noise



Best with Fourier transform Analysis



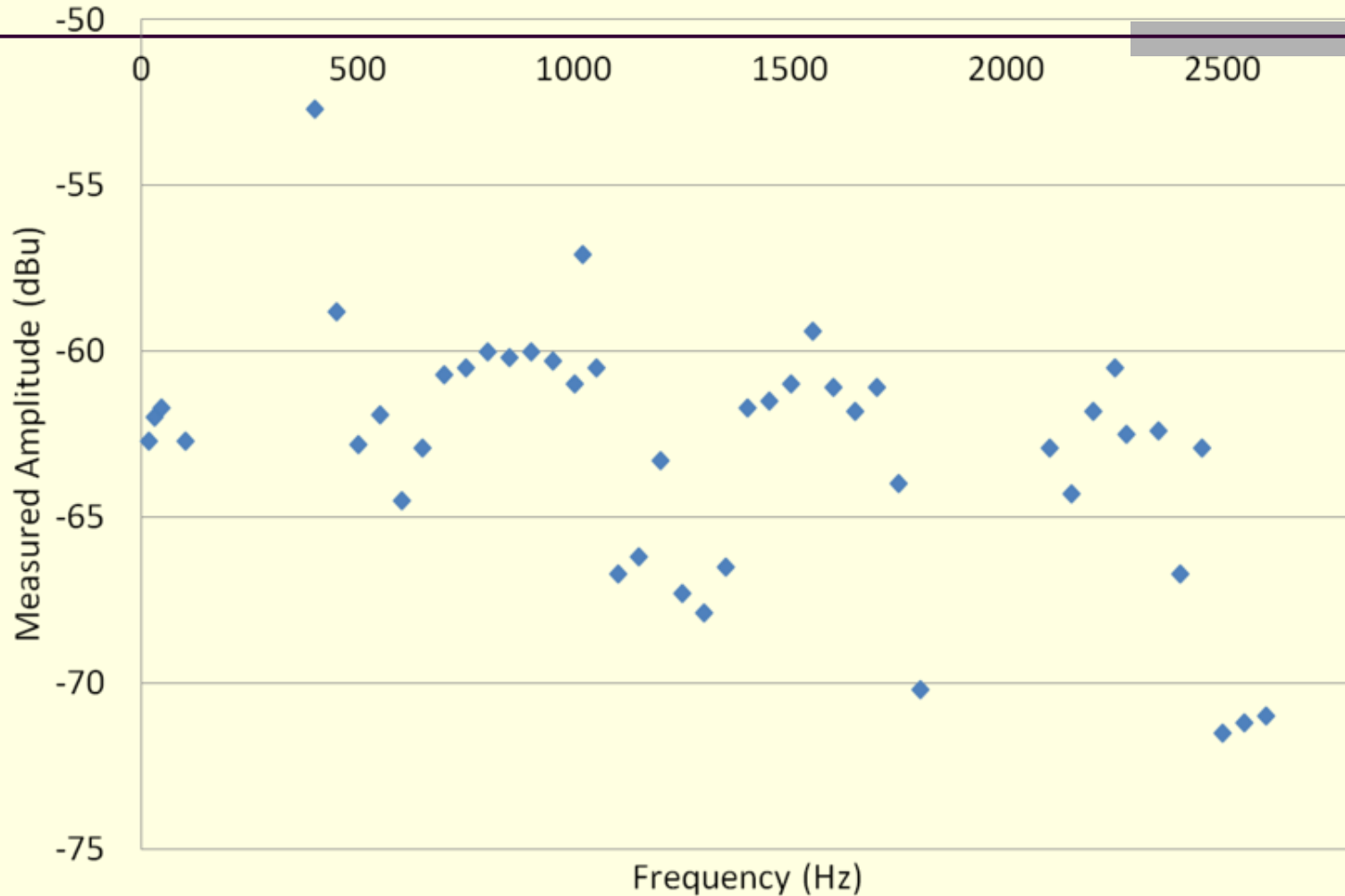
Dithering reduces the coherent length of the laser and reduces long Gauge VibroFibre performance

- It turns the full length of connecting fiber into a distributed vibration sensor
- Best used with Fourier transform signal analysis
- The sensing fiber is not as sensitive as the Vibrofibre itself
- The sensing fiber can be 1 kilometer long

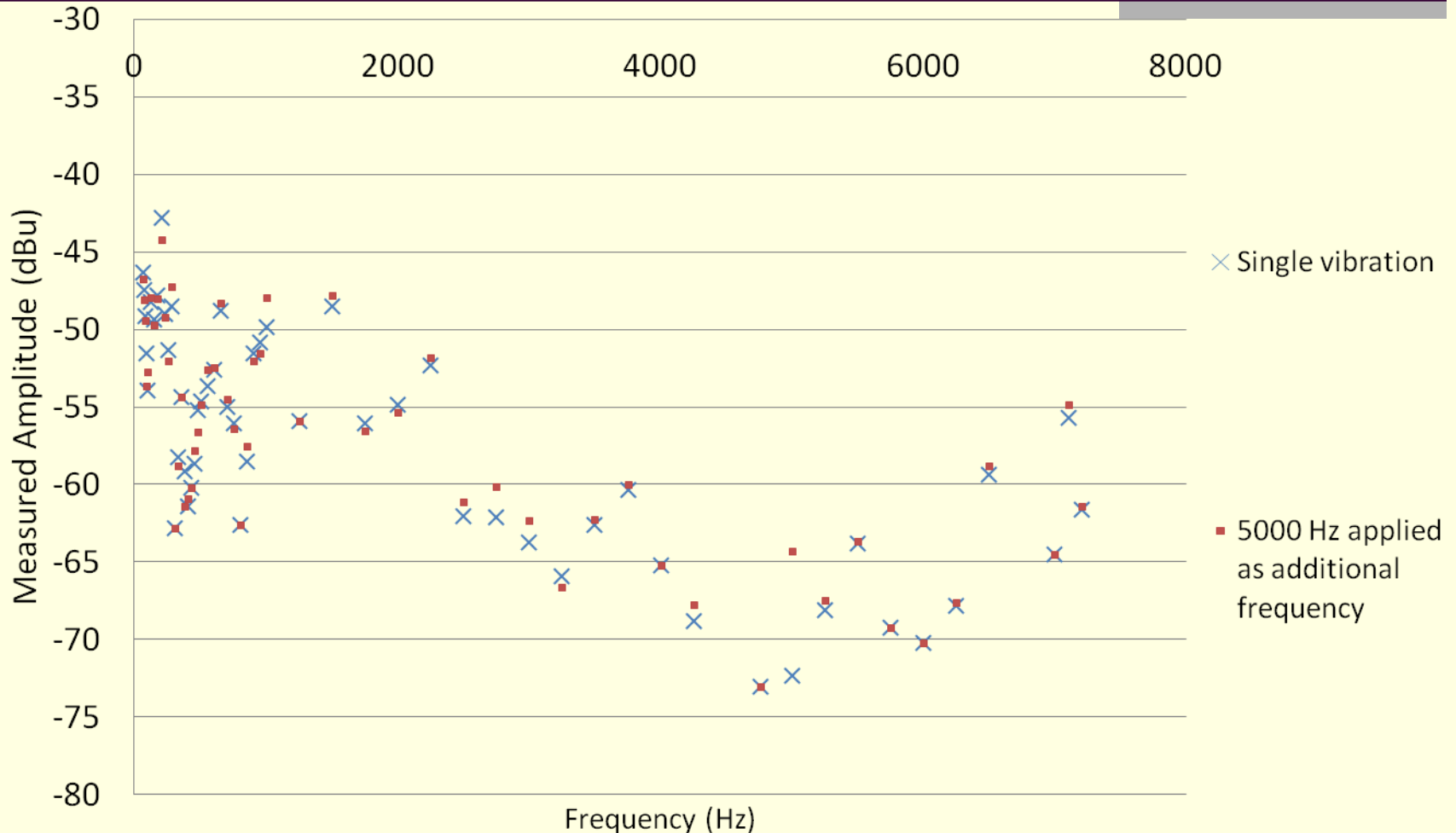
Two sections of sensing fiber are placed on different shakers to evaluate cross talk



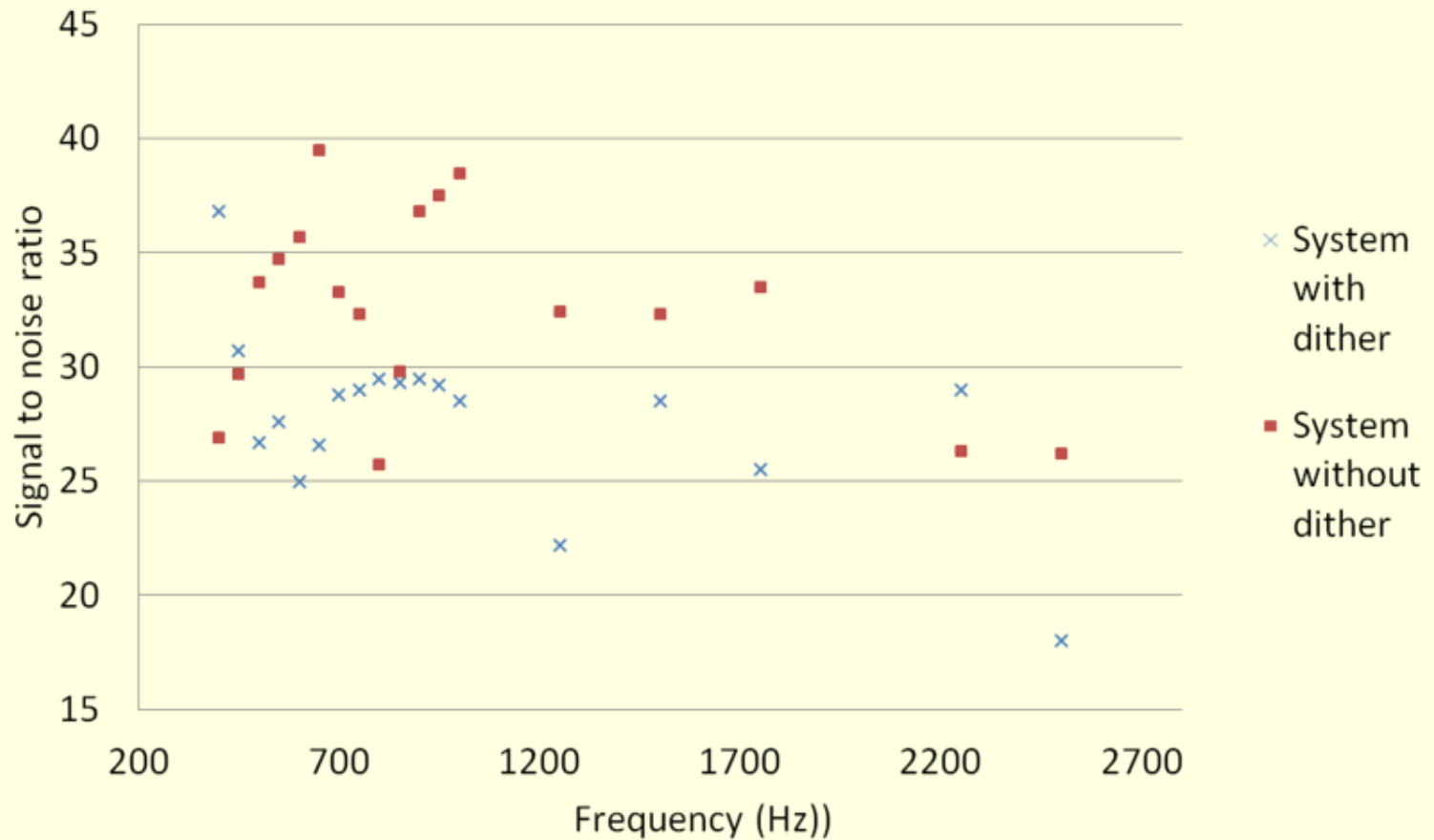
Frequency response of the interrogation system using dithering



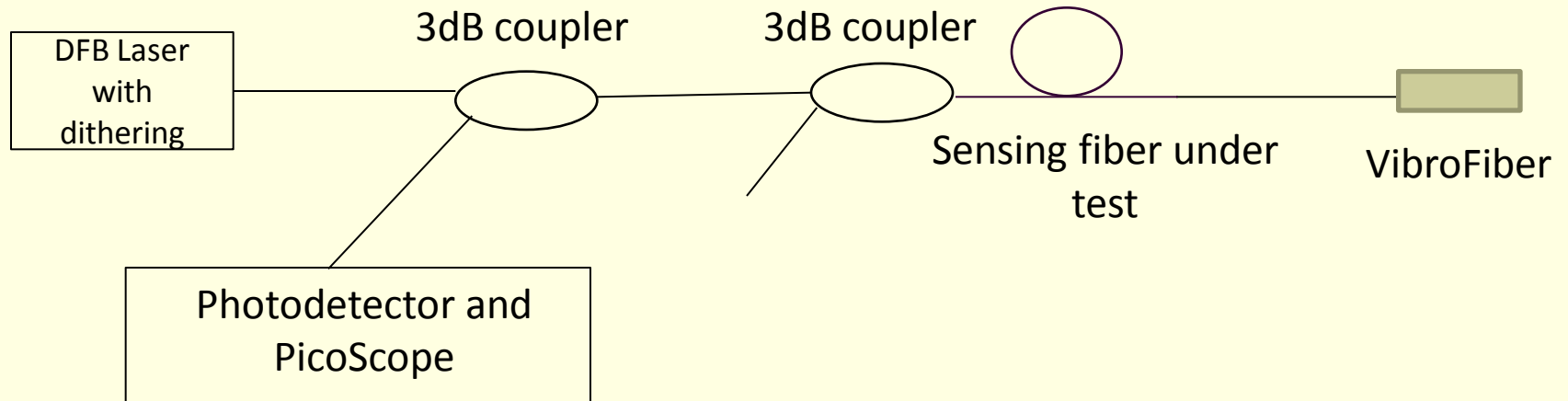
Frequency response and crosstalk characterization System without dithering



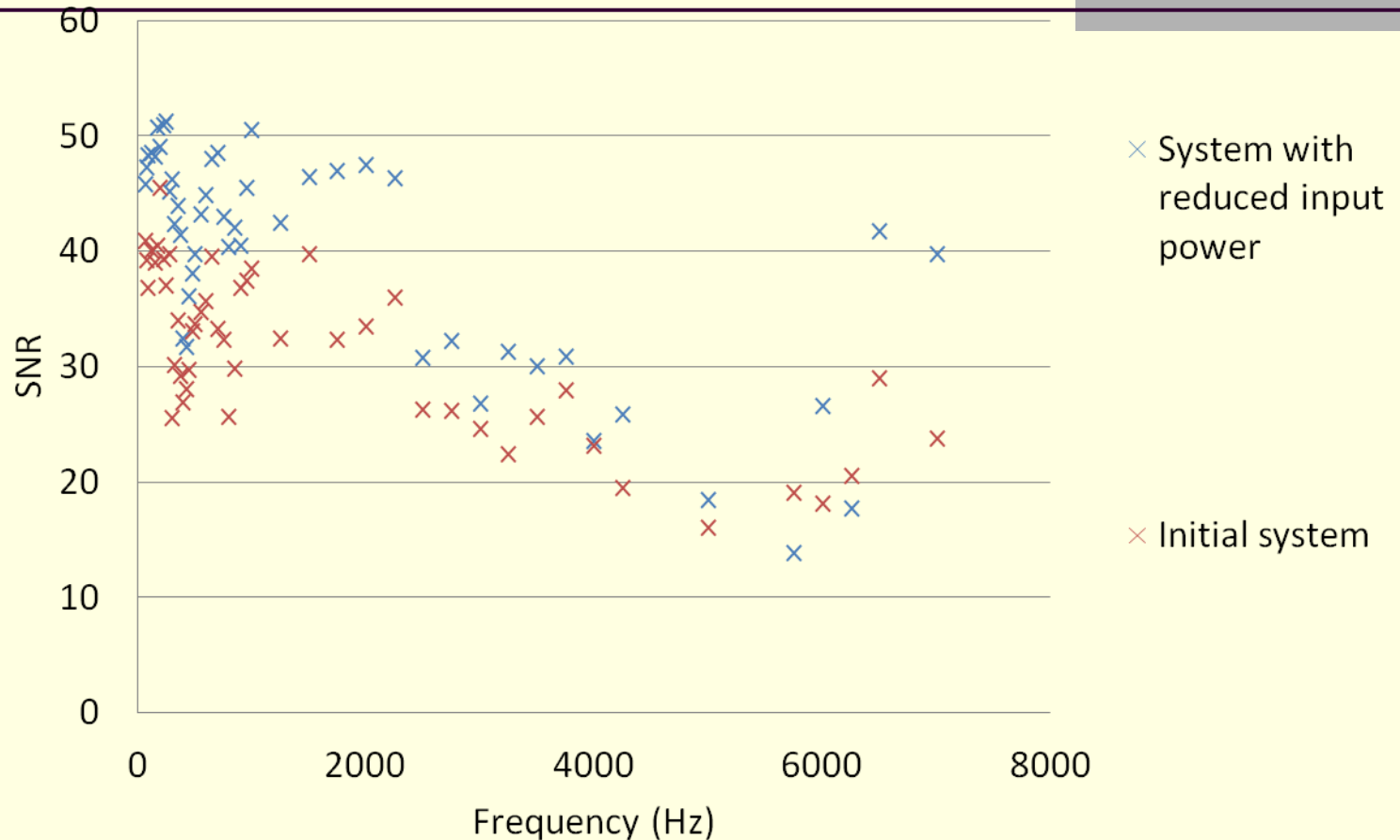
Frequency response comparison of systems with and without dithering



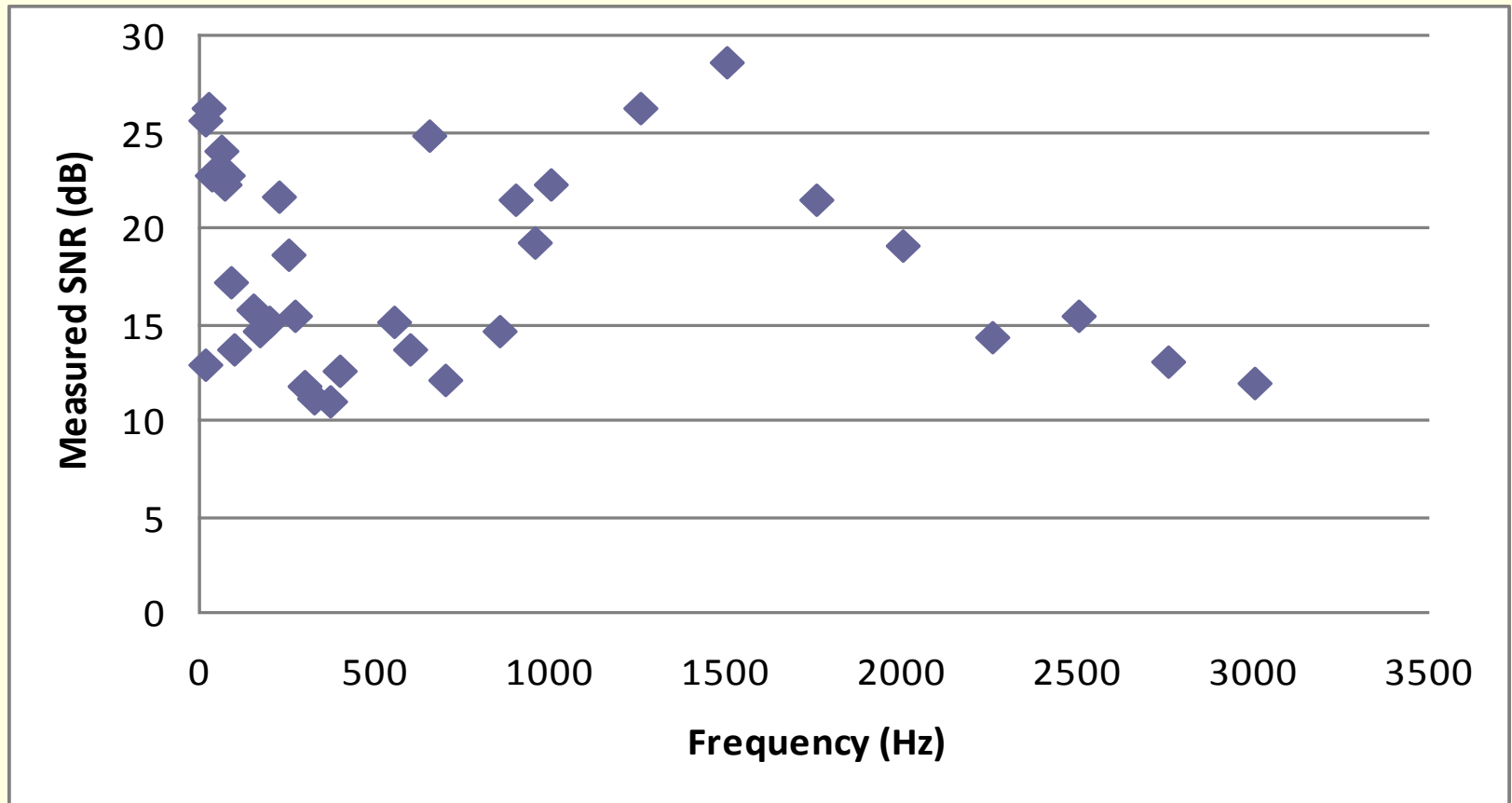
Effect of reducing the power of the DFB laser



Effect of reducing the power of the DFB laser-- better signal to noise



Long gauge terminated with high finesse cavity performance actually reduced



Summary

- Long Gauge vibration sensor is caused by interference between multiple reflections
- Dithering , reduce long Gauge performance (line width widening)
- Lowering the power of the DFB laser by about 6 dB increase SNR performance
- Termination with High finesse cavity actually hurts sensor performance
- Good for FFT analysis
- Cannot locate origin of vibration

It is the cheapest distributed Vibration sensor ----many potential applications

- Measuring vibration of the wind turbine blades to detect misalignment
- Increase the number of sensing points of large industrial motors
- Measure in slot vibration of gas fired turbine generators , works at 300 degrees C using polyimide coated fiber
- Perimeter or pipeline security detecting intrusion

Thank you for your attention

Please contact Peter Kung for more discussion

- Telephone 1-514-697-4728
- Cell phone 1-514-578-6766
- Email peter@qpscom.com
- SKYPE: peter.kung.qps