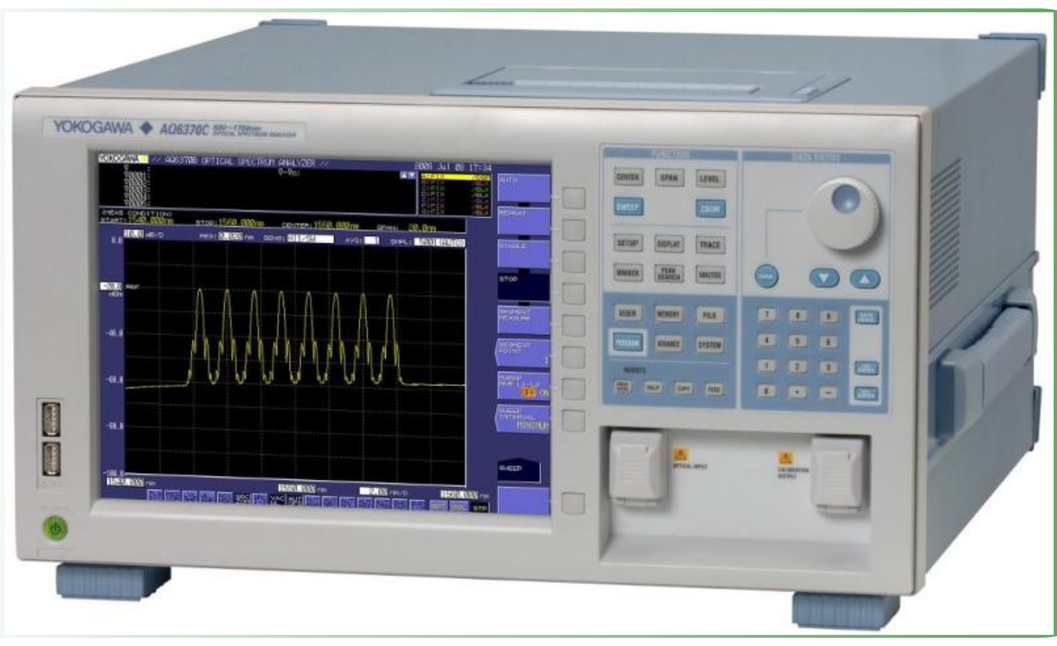
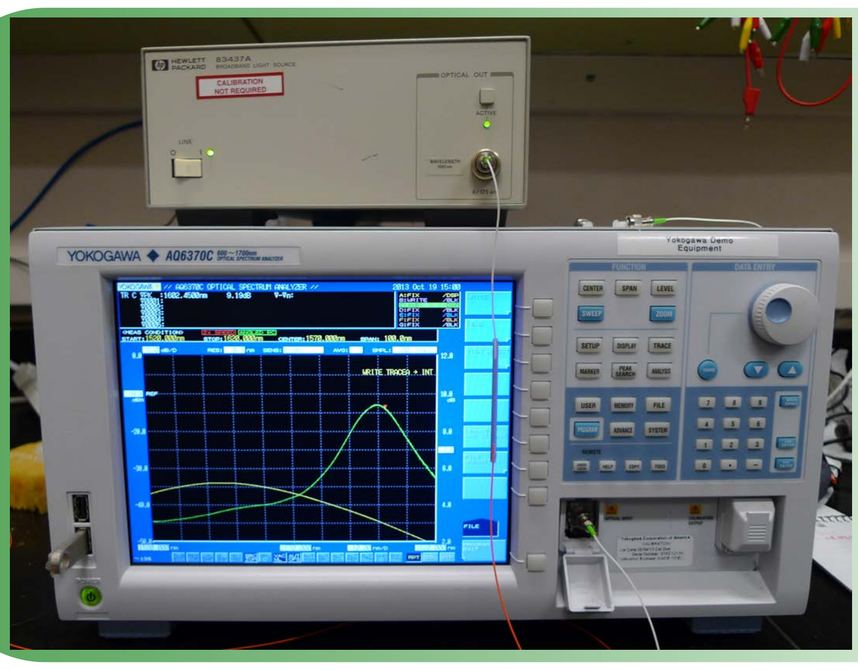
System and Process Assessment Research Laboratory
SPAR Lab
Missouri S&T

YOKOGAWA AQ6370C OPTICAL SPECTRUM ANALYZER (OSA)

Description of Equipment

- Wavelength range: 600 to 1700 nm
- High wavelength accuracy: ±0.01 nm
- High wavelength resolution: 0.02 nm
- Wide dynamic range: 78 dB typ.
- Wide level range: +20 to -90 dBm
- Fast measurement: 0.2 sec. (100 nm span)
- Applicable to single-mode and multi-mode fibers





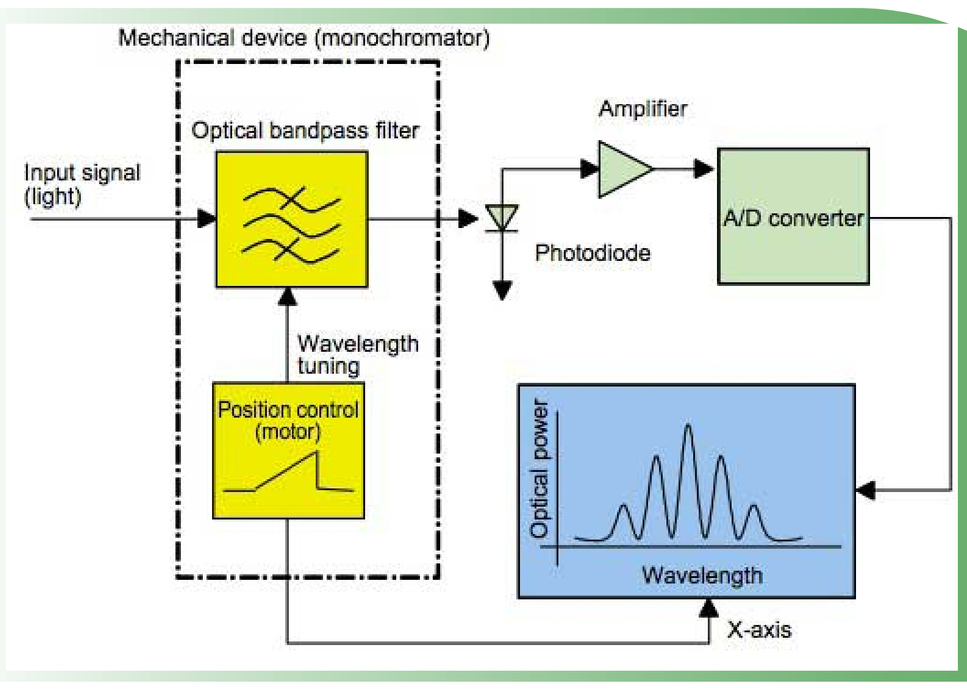
Procedure of Operation

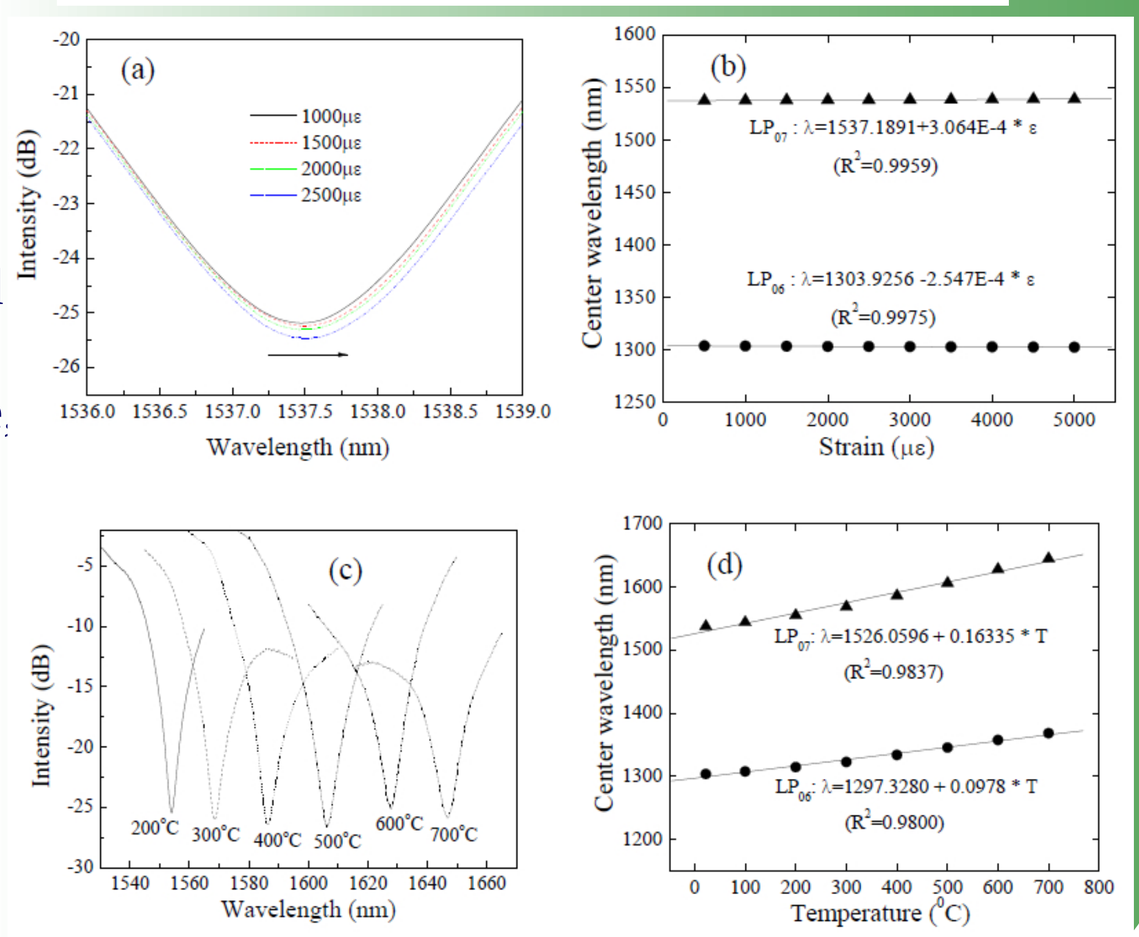
(for transmission spectrum measurement from long period fiber gratings or LPFG)

- Connect one end of the LPFG to a laser source (HP83437A)
- Connect the other end of the LPFG to OSA
- Set the OSA wavelength range to cover the interested resonant wavelength of the LPFG
- Record the transmission spectrum and ultimately provide the resonant wavelength of the LPFG through data processing

Operation Principle and Applications

- An OSA is a precision instrument designed to measure and display the distribution of power of an optical source over a specified wavelength span.
- Light passes through a wavelength-tunable optical filter that resolves into individual spectral components. Each component is converted by the photodetector into an electrical current and then by the amplifier into a voltage prior to digitization. The digitized signal is displayed as the optical power. A ramp generator determines the horizontal position and relates it to the resonant wavelength of the filter by tuning.
- An OSA can be applied to test laser and LED light sources for spectral purity and power distribution, and test transmission characteristics of optical devices in telecommunications, consumer electronics, healthcare, life science/medical research, security, sensing, microscopy, and gas/chemical analysis, and environmental monitoring.
- Example applications are to measure strain and temperature with an LPFG sensor:
  a) Spectral change with increasing strain in 7th cladding mode, LP_{07}
  b) Strain sensitivity for two cladding modes, LP_{06} and LP_{07}
  c) Spectral change with increasing temperature in LP_{07}
  d) Temperature sensitivity for two cladding modes, LP_{06} and LP_{07}





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