Measurement of young modulus of elasticity of optical fiber by using resonance method

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Abstrak

ABSTRACT
As transmission medium in optical communication system, optical fiber is also characterized by elastic properties beside of transmission properties of optical fiber. The Young Modulus of Elasticity of optical fiber could be measured by considering a bare optical fiber as cantilever which resonant with an acoustical vibration. To detect the cantilever vibration, a HeNe laser light is launched into the cantilever of optical fiber through its free end and the output laser light is detected by a PMT and observed by the channel 2 of an oscilloscope. Channel 1 of the oscilloscope observes the signal of the acoustical vibration.

Regulating both the frequency and amplitude of the vibration or the position of the pinhole of the PMT, the resonance frequency of the cantilever could be detected accurately. Using the data of the resonance frequencies of various length of the cantilever has been calculated.