

# Single-longitudinal-mode and multi-longitudinal-mode optical fibers



## Overview

The eye-shaped passive compound cavity consisting of four couplers is used to increase the longitudinal mode spacing, and its performance is numerically analyzed in detail. In general, if the linewidth of an SLM laser is narrower than the resolution of a spectrum analyzer or the nonlinear gain bandwidth of a specific medium, it is assumed to be a single-frequency laser. The generation of SLM optical signal-to-noise ratio (OSNR), ultra-narrow linewidth and extremely high stability is proposed and experimentally demonstrated. A double-ring passive subring resonator (DR-PSR) composed of two single-coupler fiber rings and a length of unpumped EDF-based saturable absorber filter is designed. The main challenge in producing a multiline output with an erbium doped fiber laser (EDFL) is the fact that the erbium ion saturates mostly homogeneously at room temperature, preventing stable multiwavelength operation. Single longitudinal mode operation of fiber lasers is desirable for many.

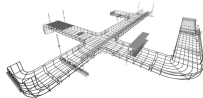
## Single-longitudinal-mode and multi-longitudinal-mode optical fibers



We propose and experimentally demonstrate a multi-wavelength fiber ring laser under single-longitudinal-mode (SLM) operation with independent tuning of channel numbers and ...



We show that modal and chromatic dispersions in fiber lasers can be counteracted by strong spatial and spectral filtering. This allows locking of multiple transverse and longitudinal modes ...



The obvious non-zero longitudinal mode frequency peaks can be observed, indicating that the laser is in a multi-longitudinal mode operation state. Therefore, it can be concluded that the ...



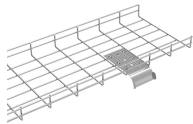
The demand for such lasers has promoted the rapid development of single-longitudinal-mode (SLM) selection technology. Here, we highlight the working principles of current mainstream ...



optical signal-to-noise ratio (OSNR), ultra-narrow linewidth and extremely high stability is proposed and experimentally demonstrated. A double-ring passive subring resonator (DR-PSR) composed of two ...



As illustrated in Fig. 3.3.2, the phase condition in a LD can be satisfied by multiple wavelengths, which are commonly referred to as multiple longitudinal modes.



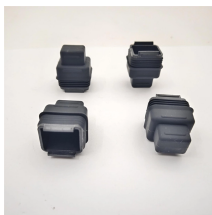
the rapid development of single-longitudinal-mode (SLM) selection technology. Here, we highlight the working principles of current mainstream SLM selection technologies and the recent ...



Simultaneous generation of first- and second-order optical vortex beams in the dual-wavelength fiber laser using different mode-selective couplers is demonstrated.



- The mechanism of single-longitudinal mode laser generation has been theoretically investigated based on Mie scattering theory.
- Multi-mode lasing as well as highly stable single ...



In order to obtain monochromatic or single-mode laser radiation, it is usually necessary to insert a frequency dependent loss element (a filter) to insure that gain exceeds loss for only a single ...

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