

ABSTRACT OF THE DISCLOSURE

Provided are a silicon-based tunable filter, laser and an optical module. The tunable laser comprises a semiconductor optical amplifier and a silicon photonic integrated chip, wherein a first coupler, a phase regulator and a tunable filter are provided on the silicon photonic integrated chip; the tunable filter comprises a flat-top band-pass filter structure, a Mach-Zehnder interferometry (MZI) structure and a micro ring resonation (MRR) structure, which are cascaded; gain light emitted by the semiconductor optical amplifier is coupled to the silicon photonic integrated chip by means of the first coupler, and a narrowband filtered optical signal is output by means of the tunable filter; and the phase of the gain light is regulated by means of the phase regulator so as to output single-peak narrowband laser light with a tunable target wavelength. Single-peak narrowband filtering is realized by means of combining a single micro ring resonation structure based on silicon photonic integration with a Mach-Zehnder interferometry structure and a band-pass filter structure. High integration, low power consumption and a small size are ensured, and at the same time, the present application has the advantages of convenient regulation, good stability, etc.

The most illustrative figure: Figure 2