

Title: Single mode EDF fiber laser using an ultra-narrow bandwidth tunable optical filter

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Abstract: Single longitudinal mode (SLM) erbium-doped fiber (EDF) laser operation using a commercialized ultra-narrow bandwidth optical filter has been demonstrated. A 2-m long EDF with an absorption coefficient of 24 dB m⁻¹ at the pump wavelength is used as gain medium. The ultra-narrow tunable filter is used for selection of a single longitudinal mode from the available spectrum of multiple modes, which originally exist in the FBG's reflection spectrum. Our approach provides a relatively simple and direct method for realization of SLM operation. A high-resolution optical spectral analyser with a resolution of 0.16 pm is used to observe the output spectrum. To verify the SLM operation, the delayed self-heterodyne method is used, giving a measured laser linewidth of 61.5 kHz.