

## Asymmetric fiber taper for narrow linewidth comb filter

### ABSTRACT

The employment of asymmetric optical fiber taper as a means for producing narrow linewidth comb filter is proposed and demonstrated. Fiber taper with different values set for the up-taper and down-taper transition regions was used to produce narrow linewidth comb filter through coupling interaction of light in the asymmetric fiber. Two configurations; single-pass and bidirectional fiber taper filters were studied and analyzed in this project. Results showed narrower 3-dB linewidth for asymmetric taper compared with uniform taper for single pass configuration. The asymmetric taper linewidth was improved further in bidirectional configuration, narrowing down to 2 nm. Bidirectional asymmetric taper filter recorded extinction ratio of 27.14 dB, which was 18 dB and 3 dB better than single-pass asymmetric taper and bidirectional uniform taper respectively. The findings emphasize the attractiveness of bidirectional asymmetric taper as a high performance optical filter.

**Keyword:** Asymmetric; Comb filter; Fiber taper; Linewidth