# Reflectivity variation in asymmetric random distributed feedback Raman fiber laser

## ABSTRACT

This paper demonstrates and discusses the effect of reflectivity on the intracavity power development and spectral profile of a 41.1 km asymmetric (half-opened cavity) random distributed feedback fiber laser with different pumping schemes. The laser cavity is confined by a fiber Bragg grating and the Rayleigh feedback amplified by Raman scattering effect that serves as virtual random distributed mirrors. The laser performance was observed by integrating a variety of power couplers while employing forward and backward pumping schemes. Forward pumping exhibits greater susceptibility to reflectivity variation compared to backward pumping. Meanwhile, higher reflectivity produced better threshold conditions but at the expense of lower saturation power. A power-saturated laser also manifested a broader spectrum than a laser conducted outside the saturation regime. These research findings will be beneficial in understanding the role of reflectivity and pumping configurations in enhancing asymmetric random distributed feedback fiber laser.

**Keyword:** Fiber laser; Random laser; Rayleigh scattering