RAMAN GAIN OF MONOCHROMATIC LIGHT IN SINGLE-MODE SILICA FIBERS AND THE FEATURES OF ITS EMERGENCE

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S u m m a r y

Stimulated Raman scattering (SRS) of light comprises the basis of functioning such photonic devices as optical fiber lasers and optical fiber amplifiers. In contrast to previous experiments, where the Raman threshold was determined phenomenologically, we have analyzed the hyper-Raman emission threshold for single-mode fibers in the framework of the rigorous consideration of the Raman gain in active laser materials. Our analysis showed that the Raman laser threshold for a monochromatic optical signal can be calculated directly from the standard equations for coupled waves, making use of only fundamental parameters of the fiber. The quantitative data for the laser threshold value as a function of the wavelength are given for a few widely used Raman fibers.