

阵列波导光栅波长解调系统的温度补偿方法的研究

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摘要：

阵列波导光栅波长解调系统具有结构简单、响应速度快等优点，由于阵列波导光栅的中心波长会受环境温度影响而产生漂移，影响解调精度。在分析了阵列波导光栅波长解调原理的基础上，提出了一种阵列波导光栅波长解调系统的温度补偿方法。该方法利用补偿光栅确定温度补偿系数，实现对阵列波导光栅波长解调系统的温度补偿，消除了温度漂移对解调精度的影响。实验结果表明，在环境温度变化范围为14-44℃时，该方法解调误差仅为2pm，较未加入补偿有明显提高，在高精度阵列波导光栅波长解调领域具有很高的应用前景。

关键词：光纤光栅；阵列波导光栅；温度补偿；补偿光栅

Research on the temperature compensaion method for the Arrayed Waveguide Grating wavelength demodulation system

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Abstract:

The arrayed waveguide grating(AWG) wavelength demodulation system has advantages of simple operation and fast response speed, Since the central wavelength of AWG shifts when the ambient temperature changes, the demodulation accuracy may be affected. In this paper, a new type of fiber Bragg grating demodulation system with temperature compensation is proposed on the bases of analysing the AWG-based wavelength demodulation principle. This method confirms the compensation coefficient in real time by adding compensation grating. In this way, temperature compensation for the AWG wavelength demodulation system is realized, and the effect to demodulation accuracy caused by temperature drift can be avoid. On condition that AWG ambient temperature ranges between 14 and 44℃, the results indicate that the demodulation accuracy can be obviously improved compared to the situation with no compensation added. The demodulation error is only 2pm. This demodulation method has fine application prospects in the field of high-precision demodulation.

Keywords: Fiber Bragg Grating; Arrayed Waveguide Grating; Temperature compensation; Compensation grating

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