

测试技术

扫描式法布里-珀罗干涉仪测量高空大气风速

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摘要 为测量中低纬度地区250km高空大气风速,采用扫描式法布里-珀罗干涉仪记录250km高度附近的OI630nm气辉辐射谱线的干涉图像。通过对观测图像分析处理,用高斯函数匹配干涉条纹强度分布以确定干涉条纹强度中心的精确位置,进而求出谱线的多普勒频移,反演出经向和纬向风速。经过理论推导,求出F-P腔间距的漂移量对风速的影响,对反演风速进行修正。由风速随时间变化曲线得到在观测期间,经向风朝南,大小在4~67m/s间变化;纬向风朝东,大小在20~100m/s间变化,最小风速误差约为6m/s。

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Wind velocity detection in upper atmosphere with scanning Fabry-Perot interferometer

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Abstract To detect the wind speed in upper atmosphere at 250km over low and middle latitude area, a scanning Fabry-Perot interferometer was used to collect the interference images of the nightglow radiation spectral line of OI630 nm at the altitude of 250 km. By analyzing and processing the images, Gaussian function was adopted to match the intensity distribution of interference fringes to get the exact position of intensity center, and to derive Doppler shifts of the spectral line. Then the two vectors of wind in the directions of latitude and longitude were deduced, the effect of the drift vector of the space of Fabry-Perot etalons on wind velocity was derived by theoretical derivation, and the deduced wind velocity was amended. The result shows that during the measurement period, the longitude wind is towards south, estimated to be 4~67m/s, the latitude wind towards east, estimated to be 20~100m/s, and the error of wind velocity is about 6m/s.

Key words [upper atmosphere wind](#) [Doppler shift](#) [Fabry-Perot interferometer](#)

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