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用激光多卜勒风速仪（LDA）测量自由射流流场

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APPLICATION OF A LASER-DOPPLER ANEMOMETER（LDA） TO MEASURE THE FLOW FIELD IN FREE JETS

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摘要 一、概述 研究射流规律是航空、宇航及一般工程研究中的一个重要课题。目前紊流理论尚不完善,实验研究必不可少。LDA是一种先进的非接触式测速工具,用它研究射流在国内尚属初探。本文总结了在自由射流流场的大规模实验研究中积累的测量经验,并介绍一些典型的测量结果。 测量在我校同轴射流风洞上进行。使用DISA55X二维后向散射LDA系统。图1

关键词：

Abstract： The flow fields of subsonic free jets, co-axial free jets and overcritical free jets have been researched experimentally and by using the LDA. The measured typical results are shown in figures 2,3,4, 5 and 6. The turbulent jets involve with a wide range of velocity arid turbulence > and involve with the influence of shock waves. the phenomena are complex. For obtaining the good measurement results, the scattering particles must be seeded correctly at first. The flow rate of seeding is dependent on the magnitude of the measured velocity and the field position which will be measured. Then, the optical frequency shift must be used, though in the free jets there is not recirculating zone. At overcritical status, the velocity values in the jet core and behind the oblique shock front can be measured correctly by LDA. But the LDA is lack of the resolution to decide on the position of shock front, as shown in figure 6.

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