

综述评论

## Micro-PIV技术---粒子图像测速技术的新进展

王昊利, 王元

西安交通大学生态环境与现代农业工程中心

收稿日期 修回日期 网络版发布日期 接受日期

**摘要** Micro-PIV是近年来发展起来的一种微尺度流动测速技术.它是传统PIV测量与光学显微技术相结合的一种整场、瞬态、定量测量方法,其基本测速原理与传统PIV相同,但在示踪粒子选择、图像获取和处理等方面两者存在较大差别. Micro-PIV突破了传统微尺度流体力学测量手段的局限性,使得对微尺度流动元件的研究从过去只能给出流量、阻力特性等有限信息逐步转向对全流场内流结构的直接测量上,并且达到了相当高的分辨率和测量精度.本文对近几年Micro-PIV技术发展状况进行了总结和分析,论述了Micro-PIV技术与传统PIV的主要区别以及具体的处理技术,反映了其在科学与工程中的应用,并对此项技术的发展作了展望.

**关键词** [Micro-PIV](#) [荧光粒子](#) [体照明](#) [布朗运动](#) [图像处理](#)

分类号

## MICRO-PIV: A NEW DEVELOPMENT OF PARTICLE IMAGE VELOCIMETRY

西安交通大学生态环境与现代农业工程中心

### Abstract

Micro-PIV is a new technique for measuring the velocity field of a micro-scale flow in recent years. It is a kind of full field, instantaneous and quantitative measurement method that combines traditional PIV with microscopic technology. Comparing with the traditional PIV, the basic principle is the same, but it is remarkably different in seeding selection, image acquisition and processing. Micro-PIV breaks through the limitation of the traditional measurement methods employed in micro-scale fluid mechanics, and extends the studies based on some limited information about flow rate and friction characters to the flow structure of the whole field directly with high resolution and precision. In the present article, the development of Micro-PIV in recent years is summarized and analysed, its differences from the traditional PIV and the processing technologies are discussed, the Micro-PIV application in science and engineering is reviewed and its progress is forecasted.

**Key words** [Micro-PIV](#) [fluorescent particle](#) [volume illumination](#) [Brownian motion](#) [image processing](#)

DOI:

通讯作者

### 扩展功能

#### 本文信息

- ▶ [Supporting info](#)
- ▶ [PDF\(4065KB\)](#)
- ▶ [\[HTML全文\]\(0KB\)](#)
- ▶ [参考文献](#)

#### 服务与反馈

- ▶ [把本文推荐给朋友](#)
- ▶ [加入我的书架](#)
- ▶ [加入引用管理器](#)
- ▶ [复制索引](#)
- ▶ [Email Alert](#)
- ▶ [文章反馈](#)
- ▶ [浏览反馈信息](#)

#### 相关信息

- ▶ 本刊中 包含 "[Micro-PIV](#)"的 相关文章
- ▶ 本文作者相关文章

- [王昊利](#)
- [王元](#)