

## 微流体装置中超声流的研究

作者: 孙宏明, 郭航

单位: 厦门大学萨本栋微机电研究中心

基金项目:

摘要:

首先应用流体动力学的基本理论, 建立起声流场的一维解析模型, 对声波在管道内部传播时产生的声场和声流运动进行探讨。然后提出并设计了一种利用PZT微管道振动产生超声场的新型微流体装置。该装置为由微管道相连接的两个微腔体, 并利用有限元法对超声波激励的微管道和腔体进行瞬态的流场数值分析, 一阶声压和流场的速度分布结果, 最后对数值结果进行处理并讨论了超声波在管道内传播时产生的声流速度以及驱动力的分布情况。

关键词: 微流体 声流速度 ANSYS 驱动力

## Investigation of Ultrasound Streaming in Microfluidic Device SUN Hong-ming, GUO Hang

**Author's Name:** SUN Hongming, GUO Hang

**Institution:** Pen-Tung Sah MEMS Research Center, Xiamen University

**Abstract:**

In this paper, Navier-Stokes equations is first employed to set up a 1-D analytical fluid dynamics model to investigate the sound field and acoustic streaming in the microchannel where the acoustic wave propagates. Then a new microfluidic device is proposed, in which two microcavities are connected by a microchannel and a PZT is used to actuate the microchannel into vibration to set up an ultrasonic field in the microdevice. For this proposed microdevice, finite element method in ANSYS is used to analyze the transient fluid field and the results of the first-order acoustic pressure and velocity in microchannel are obtained. Furthermore, the distribution of acoustic streaming and driving force in microchannel are discussed.

**Keywords:** microfluidics acoustic streaming velocity ANSYS driving force

投稿时间: 2010-04-07