Abstract Submitted
for the DFD11 Meeting of
The American Physical Society

Micro PIV Measurements of the Internal Flow of an *Amoeba proteus* CHRISTIAN RESAGK, ELKA LOBUTOVA, LING LI, Ilmenau University of Technology, Institute of Thermodynamics and Fluid Mechanics, DANJA VOGES, Ilmenau University of Technology, Department of Biomechatronics — We report about micro PIV measurements of the internal flow in the protoplasm of an amoeba. The velocity data shall give information about the mechanism of the change of amoeba's contour during its locomotion in water. The experimental data is used for an analytical modeling of the locomotion mechanism with the help of a variable contour and finally for the development of locomotion principles for micro robots. The experimental set-up consists of a microscope and a CCD camera with 12 frames per second and image analysis software. The illumination of the amoeba was done by the built-in microscope halogen lamp. We use the phase contrast configuration to capture images of the amoeba moving in water. We applied an electrical field to the water channel in order to control the movement of the amoeba in one direction. During this motion we measured time dependent velocity vector fields of the protoplasm flow, estimated velocity profiles and analyzed time series of the maximum velocity. The velocity vector plots are calculated from the images by using cross correlation and naturally occurring particles in the protoplasm. Beside the analyses of the internal flow we recorded the motion of the center of gravity and the variation of the sectional area.

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Date submitted: 27 Jul 2011 Electronic form version 1.4