

Design and Analysis of a Wetting Lens for the Pinhole Cameras of a Two Phase Flow System

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Abstract

The present work reports the fabrication process of micro lens for pinhole cameras using COMSOL Multiphysics®, by satisfying the wetting properties. Wetting means change of contact angle between the liquid and solid surface area. The wetting properties are clearly understood in terms of forces. The two immiscible fluids like conducting fluid and insulating fluid were taken for the formation of fluid-fluid and wall-fluid interfaces to obtain boundary conditions and contact angle for the lenses respectively. When a voltage (force) is applied over the lenses, the contact angle alters and hence the focal length of the lenses varies accordingly, this is called electro-wetting effect. Electro-Wetting is incorporate in the electronics family due to their reliable nature. The wetting lenses with different conducting fluids for same insulating fluid have been designed and analyzed for their focal lengths of given different input potentials. Finally, the analyses of results would help us in selecting better design to get optimum focal length (merit images) for given input potentials among all the proposed designs for the fabrication of lenses. The concept shown in this paper is open to various designs and also applicable real time applications like bio medical field, military applications, and air craft technologies.

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Figures used in the abstract

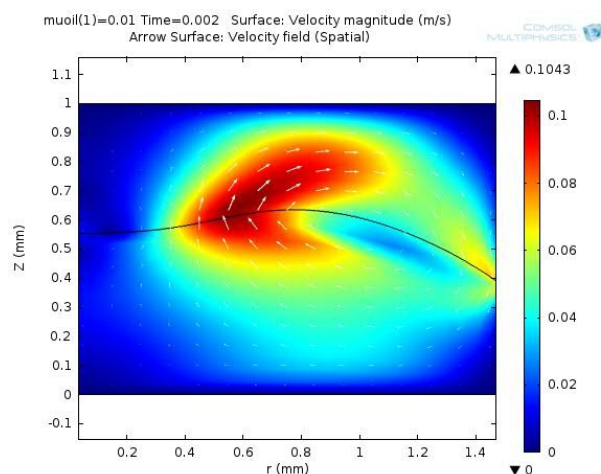


Figure 1: contact angle between insulating fluid and conducting fluid at 0[V]

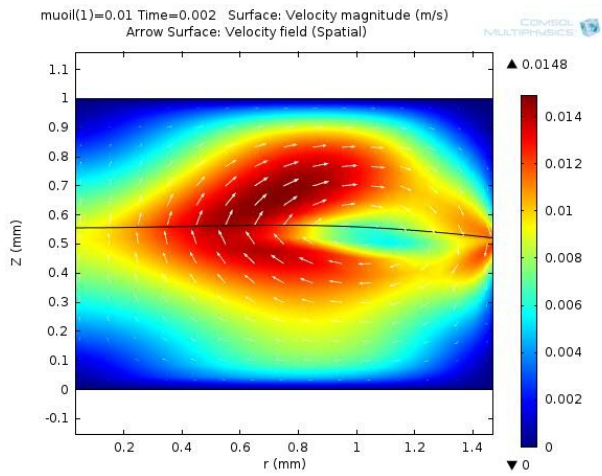


Figure 2: contact angle between insulating fluid and conducting fluid at 90[V]

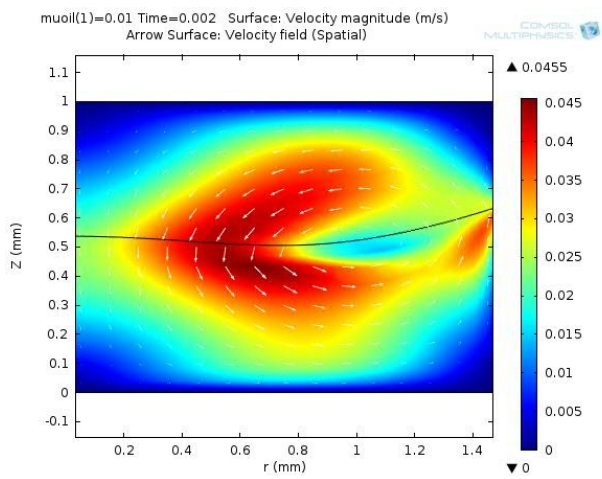


Figure 3: contact angle between insulating fluid and conducting fluid at 120[V]

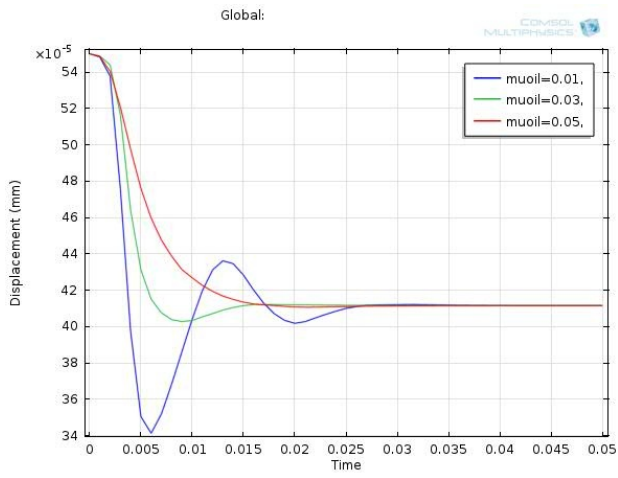


Figure 4: graphical representation of lens at various voltages