1056-35-85   **Xuming Xie*** (`xuming.xie@morgan.edu`), Department of Mathematics, Morgan State Univerity, Baltimore, MD 21251. *Well-posedness and regularity of one phase Hele-Shaw bubble problem.* Preliminary report.

We study an initial value problem for a Hele-Shaw problem with and without surface tension. The initial value problem is derived from one-phase model based on complex variables method. If the initial data is in Sobolev space, we first prove that unique local solution exists in proper Sobolev space using energy methods. Then we also discuss the higher regularity of the solution. (Received July 24, 2009)