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## Establish full covering liquid metal film flows under poor wettability conditions for liquid divertor of fusion reactor

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Investigation on effects of wettability on liquid metal free surface film flow states have been performed by numerical simulations and experiments to establish a film flow which can cover the whole bottom solid surface. The effects of density of fluid, inlet film thickness and the width of bottom solid surface on the film flow states under poor wettability conditions have been investigated by numerical simulations, the results show that the rivulet flow is easily developed when the initial film thickness is small; it is more easily developed to rivulet flow when the fluid destiny becomes smaller; the covering bottom surface becomes big with the increase of the bottom surface width. But for liquid lithium it is difficult to get the film flow which can cover the whole bottom surface has been proposed to solve above problem. Firstly an experiment of the film of GaInSn alloy flow through a chute with a multi-curve bottom surface has been done to validate above solving method, it is indicated that this method is effective and the experimental results are in agreement with numerical results. Secondly numerical simulations have been performed to get the lithium film flows which can cover the whole bottom surface, it is shown that a full covering lithium film flow can be obtained by optimizing the shape of above mentioned multi-curve bottom surface. Above results is valuable for the design of liquid divertor of magnetic fusion reactor.

## Eligible for student paper award?

No

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