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## Study of He II Boiling Flow Field around a Heater

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Boiling phenomena in He II were studied on the basis of the flow velocity field derived from flow field visualization and a PIV (Particle Image Velocimetry) measurement. Noisy and silent film boiling modes together with non-boiling state were generated on/around a horizontal planar and a cylindrical heaters. For PIV tracer particles, H<sub>2</sub>-D<sub>2</sub> micro solid particles that were neutrally buoyant in He II were used. Video images showing the development and crush of vapor bubble or film and the motions of tracer particles dragged by the normal fluid component were used for visualization and PIV-analyzed. The PIV result of the boiling velocity field indicated that they were composed of AC and DC velocity components of the normal fluid. The AC component follows the dynamic behavior of vapor phase, and the DC results primarily from the thermal counter flow and secondarily is induced by the rising vapor bubbles due to buoyancy. In this study, unsteady velocity fields are investigated as well as the steady and the RMS velocity fields. It is the objective of the study that the characteristic features of flow field of He II film boiling modes and He I boiling mode in He II as well as of the non-boiling state, are compared with each other and the difference in the heat transfer performance of each boiling mode is made clear.

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