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Experimental Investigation on Liquid Metal Flow Distribution in Insulating Manifold under Uniform Magnetic Field MASATO MIURA, YOSHITAKA UEKI, TAKEHIKO YOKOMINE, TOMOAKI KUNUGI, Department of Nuclear Engineering, Kyoto University — Magnetohydrodynamics (MHD) problem which is caused by interaction between electrical conducting fluid flow and the magnetic field is one of the biggest problem in the liquid metal blanket of the fusion reactor. In the liquid metal blanket concept, it is necessary to distribute liquid metal flows uniformly in the manifold because imbalance of flow rates should affect the heat transfer performance directly, which leads to safety problem. While the manifold is insulated electrically as well as the flow duct, the 3D-MHD effect on the flowing liquid metal in the manifold is more apparent than that in straight duct. With reference to the flow distribution in this concept, the liquid metal flow in the electrical insulating manifold under the uniform transverse magnetic field is investigated experimentally. In this study, GaInSn is selected as working fluid. The experimental system includes the electrical magnet and the manifold test section which is made of acrylic resin for perfectly electrical insulation. The liquid metal flows in a non-symmetric 180°-turn with manifold, which consists of one upward channel and two downward channels. The flow rates in each channel are measured by electromagnetic flow meters for several combinations Reynolds number and Hartman number. The effects of magnetic field on the uniformity of flow distribution are cleared.

Masato Miura
Department of Nuclear Engineering, Kyoto University

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