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Experimental Investigation of MHD Turbulent Heat Transfer for Molten Salts at Low Magnetic Field[1] CAROLINE SORENSEN, ZACHARY HARTWIG, Massachusetts Institute of Technology — In fusion power plants, a component known as the blanket is required to extract the thermal energy for energy production. MIT has proposed an innovative blanket concept based on the use of molten salts. One of the principal functions of the blanket is to cool components in close proximity to the confined fusion plasma, requiring the forced flow of molten salts through very high magnetic fields (15+ T). While the electrical conductivity of the molten salt is orders of magnitude lower than that of liquid metals (an alternative blanket fluid), it is still expected to experience significant magnetohydrodynamic effects in the high magnetic field regions. The degree to which turbulent heat transfer in the high Prandtl number salt will be degraded by the MHD effect is not known at high fields (Hartmann number in the 100s to 1000s), and it is not fully characterized for low fields. A new flow loop at MIT is used to validate and extend existing low field data (up to 2T) and Hartmann numbers in the low 10s using a molten salt simulant fluid. This paper will present temperature profiles and Nusselt number reductions for several angles with respect to the magnetic field.

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