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Ultrasound Doppler Velocimetry Measurements in Turbulent Liquid Metal Channel Flow[1] MICHEL RIVERO, CIE-UNAM, DANDAN JIAN, CHRISTIAN KARCHER, TU-Ilmenau, Germany, SERGIO CUEVAS, CIE-UNAM
— Control of molten metal flow using magnetic fields is important in industrial applications. The Electromagnetic Flow Control Channel (EFCO) is an experimental test facility, located at Ilmenau University of Technology, for the development of such kind of control systems. The working fluid is the low-melting liquid metal alloy GaInSn in eutectic composition. In this channel, flow control is realized by combining and coupling the non-contact flow driving technology of electromagnetic pumps based on rotating permanent magnets and the non-contact flow rate measurement technology termed Lorentz Force Velocimetry (LFV). The flow rate is adjusted by controlling the rotation rate of the permanent magnet system. Physically, LFV is based on measuring the force acting on a magnet system. This force is induced by the melt flow passing through the static magnetic field generated by the system and is proportional to the flow. To calibrate such flow meters, we apply UDV technique to measure and analyse both turbulent hydrodynamic and MHD flow profiles in EFCO at various Reynolds numbers.

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