

Dual-plane ultrasound flow mapping for magnetohydrodynamics

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Flows of metal melts are of outstanding importance for a variety of technological processes, especially for steel production and crystal growth. In recent developments the application of magnetic fields (magnetohydrodynamic) has been investigated to influence the flow in a defined way and to optimize the quality of the resulting product. An ultrasound measurement system for investigating complex flow structures with high resolutions and in multiple dimensions is presented. It uses four ultrasound arrays each of 67 mm width and consisting of 25 single transducers. Due to a special time multiplexing scheme realized with a fast electronic switching matrix always four transducer pairs are operated in parallel allowing a frame rate of 30 Hz. The new technique enables a flow mapping at two planes simultaneously. Instantaneous investigations of complex liquid metal flows at different scientific fields of magnetohydrodynamics will be reported.