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Relevance of Alfven Waves in Process Metallurgy under a High Magnetic Field

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Under the strong DC magnetic field now available with super-conducting magnets, the Alfven waves transit time becomes shorter than their damping time and makes these waves observable. An experiment has been performed with liquid gallium. The waves are excited at the free surface of a vertical cylinder, where an AC electric current is forced between two electrodes. The whole cell is located within a vertical coil delivering a 10 Tesla vertical DC magnetic field and the waves are detected by a pressure sensor located at the bottom wall. A linear theoretical attempt allows to interpret those observations and yields some criteria such that the waves reach the far end of the experimental

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