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Magnetohydrodynamical Analogue of a Black Hole NELSON ZAMORANO, Departamento de Física, FCFM, Universidad de Chile, FELIPE ASENJO, Departamento de Ciencias, Facultad de Artes Liberales, Universidad Adolfo Ibáñez. — We study the conditions that a plasma fluid and its container should meet to generate a magneto-acoustic horizon. This effect becomes an alternative to the analogue black hole found in a transonic fluid flow setting. In this context we use the magnetohydrodynamic formalism (MHD) to analyze the evolution of an irrotational plasma fluid interacting with an external constant magnetic field. Under certain plausible approximations, the dynamic of the field perturbations is described by a scalar field potential that follows a second order differential equation. As we prove here, this equation corresponds to the wave equation associated to a scalar field in a curved space-time. This horizon emerges when the local speed of the medium grows larger than the sound velocity. The magnetic field generates an effective pressure which contributes to the magneto-acoustic speed. We compare these results with the known physics of analogue black holes. We will also refer to our ongoing experiment that, in its first stage, attempts to reproduce the wave horizons found in an open channel with an obstacle: PRL 106, 021302(2011).

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