The hydrodynamic vortex: an exactly solvable black hole analogue NAIL   USSEMBAYEV, KAUST — We consider the Cauchy problem for the Klein-Gordon equation on an effective Lorentzian manifold describing the sound propagation on a background flow undergoing a subsonic-supersonic transition. For the hydrodynamic vortex model, a particular case of a draining bathtub geometry with non-zero circulation and no draining, we derive an exact solution and discuss its properties.

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