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On Brenner's Two Velocity Hydrodynamics

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In a series of papers over 9 years (2004-2012), Howard Brenner (1929–2013) [who was emeritus professor at MIT in chemical engineering] proposed a new theory in compressible fluid mechanics with high gradient of density based on the concept of two different velocities: the mass and the volume velocities. At the same time, D.B. with B. Desjardins discovered (with E. Zatorska later on) that a structure with two velocity hydrodynamics already exists in standard models (i.e. with one velocity field) if the shear and the bulk viscosities satisfy the BD algebraic relation. In this talk, I will try to to give an historical overview of this mathematical story and explain at the end a recent mathematical result with A. Vasseur and C. Yu.

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