

Asymptotic Behavior of systems of PDE arising in physics and biology:
theoretical and numerical points of view (ABPDE II)

Contribution ID: 7

Type: **not specified**

Global Existence of Solutions to the 3D Navier-Stokes Equations with Degenerate Viscosities

Wednesday, 15 June 2016 10:10 (45 minutes)

We prove the existence of global weak solutions for 3D compressible Navier-Stokes equations with degenerate viscosities. The method is based on the Bresch and Desjardins entropy. The solutions are obtained as limits of the quantic Navier-Stokes system. The main contribution is to derive the Mellet-Vasseur type inequality for the weak

solutions, even if it is not verified by the first level of approximation. This provides existence of global solutions in time, for the compressible Navier-Stokes equations, for any gamma bigger than one, in three dimensional space, with large initial data, possibly vanishing on the vacuum. This is a joint work with Cheng Yu. The paper will appear in *Inventiones*.

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