Abstract Submitted
for the DFD11 Meeting of
The American Physical Society

An Exact Solution of the 3D Navier-Stokes Equation AMADOR MURIEL, Harvard University — We use a time evolution equation for the single particle distribution function (Muriel, Physica D, 1997) to generate the time evolution of the velocity fields. These velocity fields are then substituted into the Navier-Stokes equation to calculate the pressure gradients. The pressure gradients are then integrated over space to generate pressure tensors. In addition, we calculate the energy fields, showing that there is no blow up. The pressure tensors, and the velocity fields constitute an exact solution to the 3D Navier-Stokes equation for a compressible fluid (Muriel, Results in Physics, 2011). All calculated fields are smooth, producing no turbulence by any generous definition of turbulence. We raise the question: is the Navier-Stokes equation the correct problem definition for turbulence? (Muriel, The Quantum Nature of Turbulence, Nova Science Publishers, New York (2010). We will display the plots of the solution in a 3D toroid configuration. The solution found may be used to reformulate fluid dynamics using an initial value formulation.

Amador Muriel
Harvard University

Date submitted: 22 Jul 2011 Electronic form version 1.4