1152-35-140 **Didier Bresch**, **Alexis F. Vasseur*** (vasseur@math.utexas.edu) and **Cheng Yu**. *Global existence of entropy solutions to the compressible Navier-Stokes equations with non-linear density dependent viscosities.*

In this work, we extend considerably the global existence results of entropy-weak solutions related to compressible Navier-Stokes system with density dependent viscosities obtained, independently (using different strategies), by Vasseur-Yu [*Inventiones mathematicae* (2016) and arXiv:1501.06803 (2015)] and by Li-Xin [arXiv:1504.06826 (2015)]. More precisely we are able to consider a physical symmetric viscous stress tensor with a shear and bulk viscosities (respectively $\mu(\rho)$ and $\lambda(\rho)$) satisfying the BD relation $\lambda(\rho) = 2(\mu'(\rho)\rho - \mu(\rho))$ and a pressure law $P(\rho) = a\rho^\gamma$ (with $a > 0$ a given constant) for any adiabatic constant $\gamma > 1$. The nonlinear shear viscosity $\mu(\rho)$ satisfies some lower and upper bounds for low and high densities (our mathematical result includes the case $\mu(\rho) = \mu\rho^\alpha$ with $2/3 < \alpha < 4$ and $\mu > 0$ constant). This provides an answer to a longstanding mathematical question on compressible Navier-Stokes equations with density dependent viscosities. (Received August 30, 2019)