

## Mathematical Physics

# Global Classical and Weak Solutions to the Three-Dimensional Full Compressible Navier-Stokes System with Vacuum and Large Oscillations

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We establish the global existence and uniqueness of classical solutions to the three-dimensional full compressible Navier-Stokes system with smooth initial data which are of small energy but possibly large oscillations where the initial density is allowed to vanish. Moreover, for the initial data which may be discontinuous and contain vacuum states, we also obtain the global existence of weak solutions. These results generalize previous ones on classical and weak solutions for initial density being strictly away from vacuum, and are the first for global classical and weak solutions which may have large oscillations and can contain vacuum states.

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