



THE UNIVERSITY  
of NORTH CAROLINA  
at CHAPEL HILL

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## 2024 Mini-School

April 6<sup>th</sup>  
Phillips Hall 332  
9:00–10:00 AM

### Self-similar imploding solutions for compressible Navier-Stokes and supercritical defocusing NLS

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**Abstract.** We will talk about singularity formation for the 3D isentropic compressible Euler and Navier-Stokes and for higher dimensional NLS. Finite time singularities for radially symmetric data were found in the work of Merle, Raphaël, Rodnianski and Szeftel for both equations, based on self-similar imploding solutions. We will construct new self-similar profiles corresponding to larger self-similar exponents. In the case of 3D compressible Euler and Navier-Stokes, this also allows to treat different values of the adiabatic constant (in particular, gives the first such result for monatomic gases, where the adiabatic constant is  $5/3$ ). We will also explain how to upgrade the radially symmetric stability analysis to the nonradial case, which allows to show singularity formation for nonradial initial data and in the periodic setting. The talk is based on joint works with Buckmaster, Gomez-Serrano, Shi, and Staffilani.