

Alessia Nota, Gran Sasso Science Institute

Titolo: *Dynamics of Non-Equilibrium systems: Homoenergetic Solutions to the Boltzmann equation*

Abstract: In this talk I will consider a particular class of solutions of the Boltzmann equation, known as homoenergetic solutions, which were introduced by Galkin and Truesdell in the 1960s. These are a particular type of non-equilibrium solutions of the Boltzmann equation which are useful to describe the dynamics of Boltzmann gases under shear, expansion or compression. While their well posedness theory has many similarities with the theory of homogeneous solutions of the Boltzmann equation, their long-time asymptotics differs completely, due to the fact that these solutions describe far-from-equilibrium phenomena. Indeed, the long-time asymptotics cannot always be described by Maxwellian distributions. For several collision kernels the asymptotics of homoenergetic solutions is given by particle distributions which do not satisfy the detailed balance condition. I will present different possible long-time asymptotics of homoenergetic solutions to the Boltzmann equation, including their counterparts in the Rayleigh–Boltzmann equation under shear deformation. Finally, I will discuss some conjectures and open problems in this direction.