UNIVERSITÀ DI PARMA

DIPARTIMENTO DI SCIENZE MATEMATICHE, FISICHE E INFORMATICHE

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Seminari di Fisica Matematica

Prof. **Manuel Torrilhon** (RWTH Aachen University)

Mercoledì 13 marzo 2024 ore **11:00**

Aula F, Plesso di Matematica

Extended fluid dynamics: Mathematical modelling and simulation for rarefied gases

Abstract: The traditional equations of fluid dynamics with the constitutive laws of Navier-Stokes and Fourier for stress tensor and heat flux are known to lose their validity when the Knudsen number - the ratio between the mean free path and a macroscopic length - becomes significantly large. Instead, the non-equilibrium regime requires modeling based on the statistical description of kinetic gas theory and Boltzmann equation. Using moment equations we extend the classical fluid dynamic equations for processes with moderate Knudsen numbers. We will present the regularized 13-moment-equations (R13) within the framework of moment approximations which offer a compromise between stability and robustness, simplicity and physical accuracy. We will discuss the mathematical structure and physical predictions of the R13 system, as well as numerical solutions in detail.

Organizzatori: Andrea Bondesan, Maria Groppi

Funded by the European Union

MesoCroMo - Project n. 101110920