UNIVERSITÀ DEGLI STUDI
DI MODENA E REGGIO EMILIA

Il giorno 25 Novembre 2026, alle ore 15:20

Dr. Thiago Carvalho Corso
University of Stuttgart (IANS)

TERRÀ UN SEMINARIO DAL TITOLO

“Density functional theory meets potential theory: a capacitary criterion for Hohenberg–Kohn uniqueness”

In this talk, I will first recall three fundamental questions in Density Functional Theory (DFT) concerning existence, uniqueness, and regularity in the Kohn–Sham framework. I will then motivate the inclusion of distributional (or rough) potentials in DFT by briefly discussing recent results that allow for a rigorous formulation of the theory in one dimension.

The main part of the talk will focus on the Hohenberg–Kohn uniqueness problem within the class of Laplace form-bounded distributional potentials in arbitrary dimensions. Using classical tools from potential theory, we establish a necessary and sufficient criterion for uniqueness in terms of quasi-everywhere positivity of the single-particle density. I will outline some of the key ideas behind the proof and discuss how this characterization leads to uniqueness of the Kohn–Sham potential.

References

[1] T. C. Corso, A rigorous formulation of density functional theory for spinless fermions in one dimension, Lett. Math. Phys. 116, 27 (2026).

[2] T. C. Corso and A. Laestadius, A quantitative Hohenberg–Kohn theorem and the unexpected regularity of density functional theory in one spatial dimension, arXiv:2512.04726 (2025); to appear in J. Spectral Theory.

[3] T. C. Corso, A maximal Hohenberg–Kohn theorem for non-interacting systems via potential theory, arXiv:2607.12852 (2026).

Aula L1.3 – Via Campi 213/A (Fisica)
Durata: 35 min + 5 min di discussione

È gradita la partecipazione di docenti, ricercatori e studenti.

L’organizzatore
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