TU-K To Host CIMPA School in June 2026

Theme: Fundamentals of Density Functional Theory

28 June – 11 July 2027 | Technical University of Kenya, Nairobi

We are pleased to announce the upcoming **CIMPA School on the Fundamentals of Density Functional Theory (DFT)**, hosted by the Department of Physics, Earth and Environmental Sciences at the Technical University of Kenya (TU-K).

Density Functional Theory is the cornerstone of modern computational materials science, chemistry, and biophysics. While its application is widespread due to the availability of powerful computer codes, a deep understanding of the underlying theoretical framework is essential for meaningful research. This school is specifically designed to bridge the gap between being a "user" of software and becoming an "architect" of scientific methodology.

Overview

This 10-day intensive program is part of the **APhRICA** (Advanced Physics Training and Collaboration with Africa) initiative. Unlike typical workshops that focus on software tutorials, this school prioritises **pen-and-paper derivations**, conceptual clarity, and the mathematical rigor of the many-body problem.

- **Target Audience:** Master's students, PhD candidates, and young faculty from East Africa (Kenya, Rwanda, Uganda, Tanzania).
- **Capacity:** Limited to 25 participants to ensure high-quality interaction.
- **Format:** Flipped classrooms, blackboard lectures, peer-learning groups, and interactive Q&A.

Scientific Program & Curriculum

The curriculum is structured to take participants from the basic Schrödinger equation to advanced topics in time-dependent DFT and strong correlation.

Core Modules

- **The Many-Body Problem:** Understanding the exponential scaling of wavefunctions and the necessity of functionals.
- **Foundations:** Hohenberg-Kohn theorems, the Kohn-Sham auxiliary system, and exchange-correlation functionals.

- **Advanced Approximations:** LDA, GGA, Hybrid functionals, and Van der Waals interactions.
- **Extensions:** Time-Dependent DFT (TDDFT), Linear Response Theory, and the LDA+U scheme for strongly correlated systems.

Pedagogical Approach

- **Blackboard Derivations:** Step-by-step mathematical proofs.
- **Interactive Sessions:** Using the **IDEA code** for 1D model systems to visualize theoretical concepts.
- **Flipped Classroom:** Integration of the Ecole Polytechnique MOOC on DFT.

Organizing Committee & Teaching Team

The school brings together a distinguished team of local and international experts:

- **Michael Atambo** (Coordinator, Technical University of Kenya)
- **Matteo Gatti** (Coordinator, CNRS & Ecole Polytechnique, France)
- **George Amolo** (Technical University of Kenya)
- **Eleonora Luppi** (Sorbonne Université, France)
- **Gladys King'ori** (Technical University of Kenya)
- **Victor Odari** (Masinde Muliro University of Science and Technology, Kenya)
- **Miriam Chepkoech** (Technical University of Kenya)

Logistics & Participation

Venue & Accommodation

- **Venue:** Technical University of Kenya (TUK), Haile Selassie Avenue, Nairobi.
- **Accommodation:** Foreign and non-local participants will be hosted at the **YMCA Central Hostel**, a safe environment within walking distance of the University.

How to Apply

In accordance with CIMPA regulations, all applications must be submitted through the official CIMPA website.

> **Important:** Please do not seek a registration form on this page. All applications are centralized via the link below.

https://www.cimpa.info/fr/form/extra-form-02?token=EiOy3S1HhVvGB0DU0vbZEH91ulXwYWHSvL6W1S82W1c

Key Dates

- **School Dates:** June 28 – July 11, 2027
- **Application Deadline:** [Check CIMPA Website for Deadlines]

Contact Information

For local inquiries regarding the venue or travel to Nairobi, please contact: **Dr. Michael Atambo**
Department of Physics, Earth and Environmental Sciences Email: michael.atambo@tukenya.ac.ke

For more information on the Materials Modelling Group at TUK, visit: https://materials-modelling-group.github.io/