



TU-K Leading the Way to Theoretical Excellence In Materials Modelling With The APhRICA Initiative

It is Imperative that we build capacity and excellence in all things condensed matter physics in Kenya and the region, and doing this while taking advantage of efforts from other stakeholders such as the Materials Research Society of Kenya (MRSK) and the KENET Computational Material Modeling Special interest group (CMMS), Moi University and MMUST. This knowledge of condensed matter physics plays an important role in our understanding of everything from transparent conducting oxides in our phones to superconductivity used in MRI machines for healthcare. For us to continue producing world class research and innovation, as well as go beyond the state of the art, this training is imperative for our current faculty and future researchers.

These local efforts to develop condensed matter physics expertise have provided a nexus for the development of collaboration with world class experts from the CNR-ISM (Rome, Italy) and the CNRS (Paris, France) to enhance the existing training and address gaps in knowledge. While prior efforts have seen activities in and around DFT related research and training through the ASESMA initiative (African School On Electronic Structure Methods), a crucial missing component is the appreciation for and expertise in Many Body Theory. This leaves a crucial area that is inadequately addressed, this is the area of Many Body Theory, a gap that is visible in the type of research work that has been pursued in recent years.

Building on the prior Electronic Structure training efforts, this work will expand efforts towards advancement rather than building from the ground up. These critical factors of a preexisting community and basic training present at TU-K and EAFIR are not common in the region, and these make this effort both possible and very likely to succeed. From a regional point of view, Kenya is both open to visitors from the EAC (Kenya, Uganda, Tanzania, Rwanda and Burundi), and the wider African region without stringent VISA requirements, and will form a strong center from which further efforts can be based on to advance the wider region.

The first part of the training is proposed to take place physically at ICTP-EAIFR, in December 2024 for 2 weeks, which will cover these foundational topics. The event is organized by CNR-ISM with ICTP-EAIFR (funded by the MUR PRIN 2020 CONQUEST project), and will include partners and participants from these institutions:

KENYA

Technical University of Kenya

Masinde Muliro University of Science and Technology

Moi University

Edgerton University

KAFUKO

Maasai Mara University

ITALY

CNR-ISM, Rome

FRANCE

CNRS, Paris

RWANDA

ICTP-EAIFR, Kigali