



UNIMORE Dipartimento di Scienze Fisiche,
Informatiche e Matematiche

UNIVERSITÀ DEGLI STUDI DI
MODENA E REGGIO EMILIA



FIM-S3 SEMINAR

Charge Density Wave Materials Probed in Time and Momentum Space

Monday May 29th, 2023 – 15.00

S3 Seminar Room, 3rd Floor, Physics building

Remote link: <https://tinyurl.com/EnricoDaComo>

Speaker

Enrico DA COMO – University of Bath (UK)

Abstract

Charge density wave phenomena involving periodic electronic charge order in solids are common in low dimensional quantum-materials. They arise from a delicate balance of electron-electron and electron-phonon interactions. The interest in understanding these systems comes from the associated metal to insulator transitions with potential applications in switching devices and memristors.

In this talk, I will present our recent research efforts in offering an accurate description of the electronic structure. In particular, combining angle resolved photoemission spectroscopy and band structure calculations, I will illustrate the nature of the CDW in the quasi-2D crystal, 1T-TaSe₂.^{1,2} In addition, by performing experiments with time resolution <100 fs, I will explain how coherent phonon oscillations seen in the band structure allow for an estimation of the anharmonic potential characterizing the amplitude mode of the CDW condensate.³ The results are a step forward in the understanding of CDW physics in TaSe₂ compounds and towards establishing time- and momentum-resolved photoemission as valuable methods for quantum materials.

(1) Sayers, C. J.; Hedayat, H.; Ceraso, A.; Museur, F.; Cattelan, M.; Hart, L. S.; Farrar, L. S.; Dal Conte, S.; Cerullo, G.; Dallera, C.; et al. *Phys. Rev. B* **2020**, *102* (16), 161105.

(2) Sayers, C. J.; Cerullo, G.; Zhang, Y.; Sanders, C. E.; Chapman, R. T.; Wyatt, A. S.; Chatterjee, G.; Springate, E.; Wolverson, D.; Da Como, E.; Carpena, E. *Phys. Rev. Lett.* **2023**, *130* (15), 156401.

(3) Sayers, C.; Cerullo, G.; Zhang, Y.; Sanders, C. E.; Chapman, B.; Wyatt, A. S.; Springate, E.; Wolverson, D.; Da Como, E.; Carpena, E. *Under Review* **2023**.

In collaboration with

