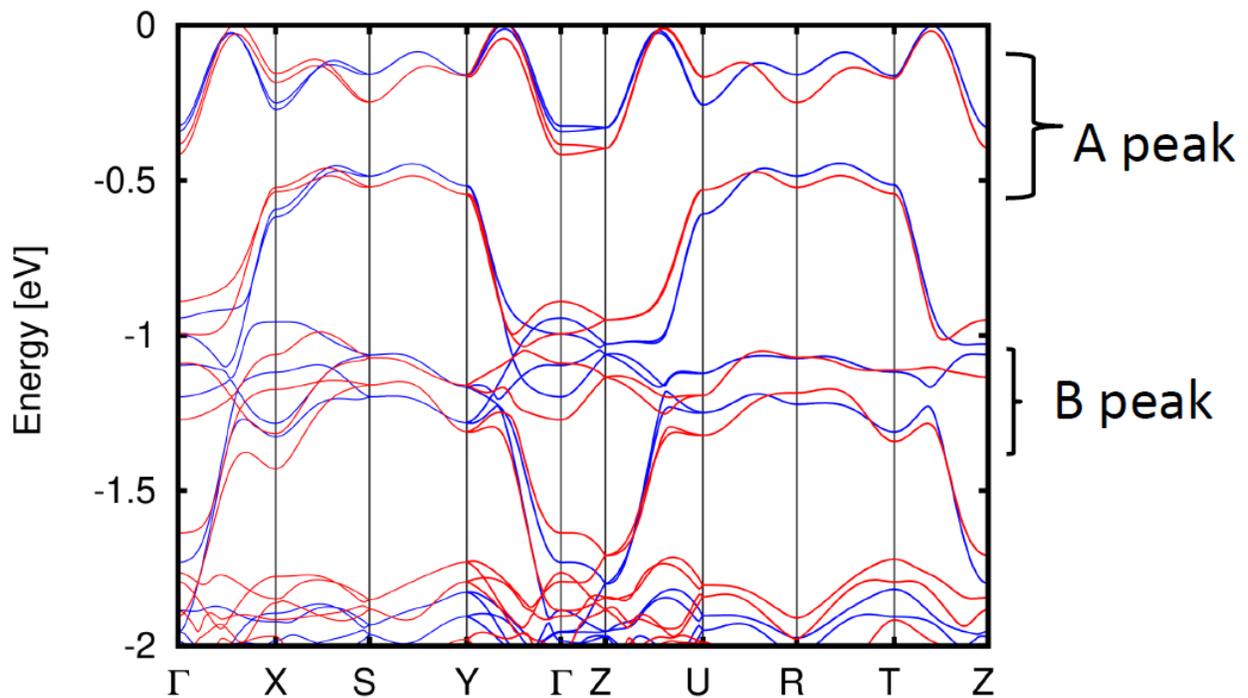


Carmine Autieri @ the Centro Nazionale delle Ricerche-SPIN, Fisciano (Italy) in September 2022.

From 21.09.2022 until 29.09.2022 I was visiting Dr. Mario Cuoco, Director of the unit of Salerno of the Centro Nazionale delle Ricerche-SPIN, with whom I have a very active collaboration. Dr. Cuoco is a leading expert in the investigation of the topology and Berryology in thin film of Ta- and Nb-based superconductors with A15 crystal structure and electronic structure of Ca_2RuO_4 .

During my stay, I've learned how to evaluate the band structure and density of states of Ca_2RuO_4 using numerical simulations within density functional theory, for different cases, as shown in the Figure. We established a collaboration with other experimental groups, as results of these meetings there will be an abstract to the APS March Meeting in Las Vegas (March 6 - 10, 2022) with title "Band structure effects of a current-induced Mott-insulator to metal-transition in Ca_2RuO_4 " and two authorships from Institute of Physics, Polish Academy of Sciences.

During the training, I enjoyed scientific discussions and brainstorming with all the members of the unit led by the Dr. Mario Cuoco. The layouts for forthcoming two papers have been laid down. Other directions of our joint collaboration have been identified. Another project will be related to the spin-Hall effect in Ta- and Nb- based superconductors with A15 crystal structure that will be developed in the coming months.



Electronic properties of Ca_2RuO_4 . Band structure of the antiferromagnetic phase of Ca_2RuO_4 in the unstrained case (blue curve) and in case of 3% of tensile strain along the c-axis (red curve). The A and B peaks follow the notation described in the paper Sutter et al Nature Communications volume 8, Article number: 15176 (2017). Figure done in collaboration with G. Cuono.