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Strong electronic correlations and spin-orbit coupling in layered ruthenates[1] FRANK LECHERMANN, MALTE BEHRMANN, CHRISTOPH PIEFKE, I. Institute for Theoretical Physics, University of Hamburg, Germany — The combination of the local-density approximation to density functional theory with explicit many-body approaches has proven to be a powerful tool to investigate the problem of strong electronic correlations on a realistic level. Notably in quasi-twodimensional materials the interaction between the effective dimensionality and the symmetry of the underlying crystal structure with the competition between the localized and the itinerant character of electrons is indeed giving rise to highly interesting physical phenomena, especially within the family of transition-metal oxides. Here we want to focus on the intriguing interplay between rotational-invariant local Coulomb interactions and spin-orbit coupling for the case of the layered strontium ruthenates within the $Sr_{n+1}Ru_nO_{3n+1}$ Ruddlesden-Popper series. Novel results based on a generic realistic modelling of the correlated electronic structure for the n=1,2 members of this family of compounds will be discussed [1]. In this respect, also the intriguing metamagnetic behavior of $Sr_3Ru_2O_7$ will be addressed.

[1] M. Behrmann, C. Piefke and F. Lechermann, Phys. Rev. B 86, 045130 (2012)

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Frank Lechermann
I. Institute for Theoretical Physics, University of Hamburg, Germany

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