Spin polarisation and dichroism effects in ARPES of 2D materials

Poster/Oral Presentation
Date of presentation
Time of presentation

J. Minar[1]*

[1]*University of West Bohemia, New Technologies - Research Centre, Plzeň, Czech Republic*

*e-mail: jmminar@ntc.zcu.cz

Angle-resolved photoemission spectroscopy (ARPES) is a leading experimental probe for studying the electronic structure and complex phenomena in 2D quantum materials. On the theoretical side, it is quite common to interpret measured ARPES data by simple comparison with calculated band structure. However, various important effects, like matrix elements and final state effects, are in this way neglected. Here we extended and developed one-step model of photoemission [1,2] in order to describe and understand our experimental ARPES studies of transition metal dichalcogenidesdichalcogenides with the focuse on the linear dichroism in MoS_2 [3], hidden spin polarisation in $HfTe_2$ [4,5], ultrafast femtosecond spin dynamics of Weyl points of WTe_2 [6] and proximity induced spin-orbit interaction in $MoSe_2$ over-layered with amorphous Pb films.
Finally, we review also by us introduced new type of dichroism measurements, so called time-reversal dichroism in photoelectron angular distributions (TRDAD) to reveal hidden orbital pseudospin texture of WSe_2 and $TiTe_2$ [8].

References

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