Fe-PEEM-PRL

- **Introduction**
  - Role of XMCD-PEEM for magnetic domain imaging
    - Requirement for SR
      - availabbility
    - Mainly CW application
    - Limitation in SR pulse duration to ps
  - Need for ultrafast imaging of magnetization and spin dynamics
  - Observations so far for threshold MCD PEEM
    - Only small MCD asymmetries reported for in-plane magnetization
      - stopped any further threshold MCD PEEM
    - out-of-plane MCD asymmetries up to 12 % reported for Ni/Cu
  - Here and new
    - concept of darkfield MCD PEEM in threshold photoemission
      - Momentum selection
      - Kinetic energy selection
      - Laser excitation
      - Approach rationalized by symmetry consideration for photoemission
      - Quantitative comparison with full-relativistic photoemission calculations
- **Main**
  - Conceptual basis
    - Definition of 3 asymmetries

      Equation 1

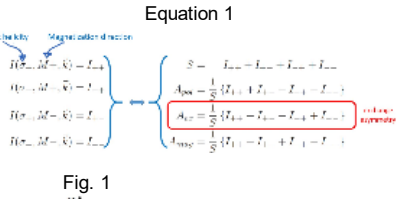
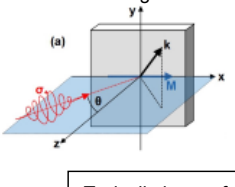
      
    - Symmetry discussion

      Fig. 1

    - Photoemission selection rules
      - Typically known for k=0
    - Photoemission calculations
      - Omni
  - Experimental aspects
    - PEEM setup
    - polarization optics for Hg source
    - Laser setup
  - Energy-dependent A_ex

    Fig. 2

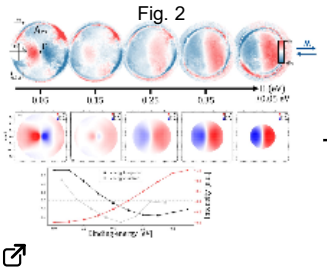
    
    - Momentum-resolved A_ex
  - Energy-dependent A_pol

    Fig. 3

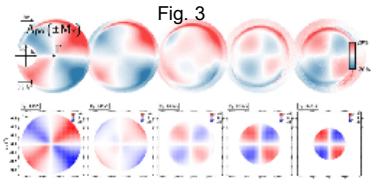
    
  - Darkfield-MCD domain imaging

    Fig. 4

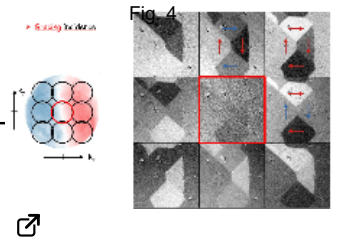
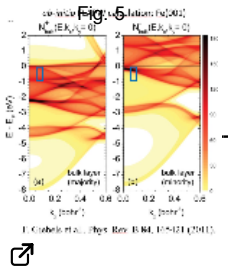
    
  - Theoretical explanation via band structure

    Fig. 5

    
    - Better: band structure from actual calculation
  - Discussion of generality of approach (other in-plane ferromagnetic metals; out-of-plane sensitivity)
- **Conclusion**