

The electronic structure of GdN from x-ray spectroscopy

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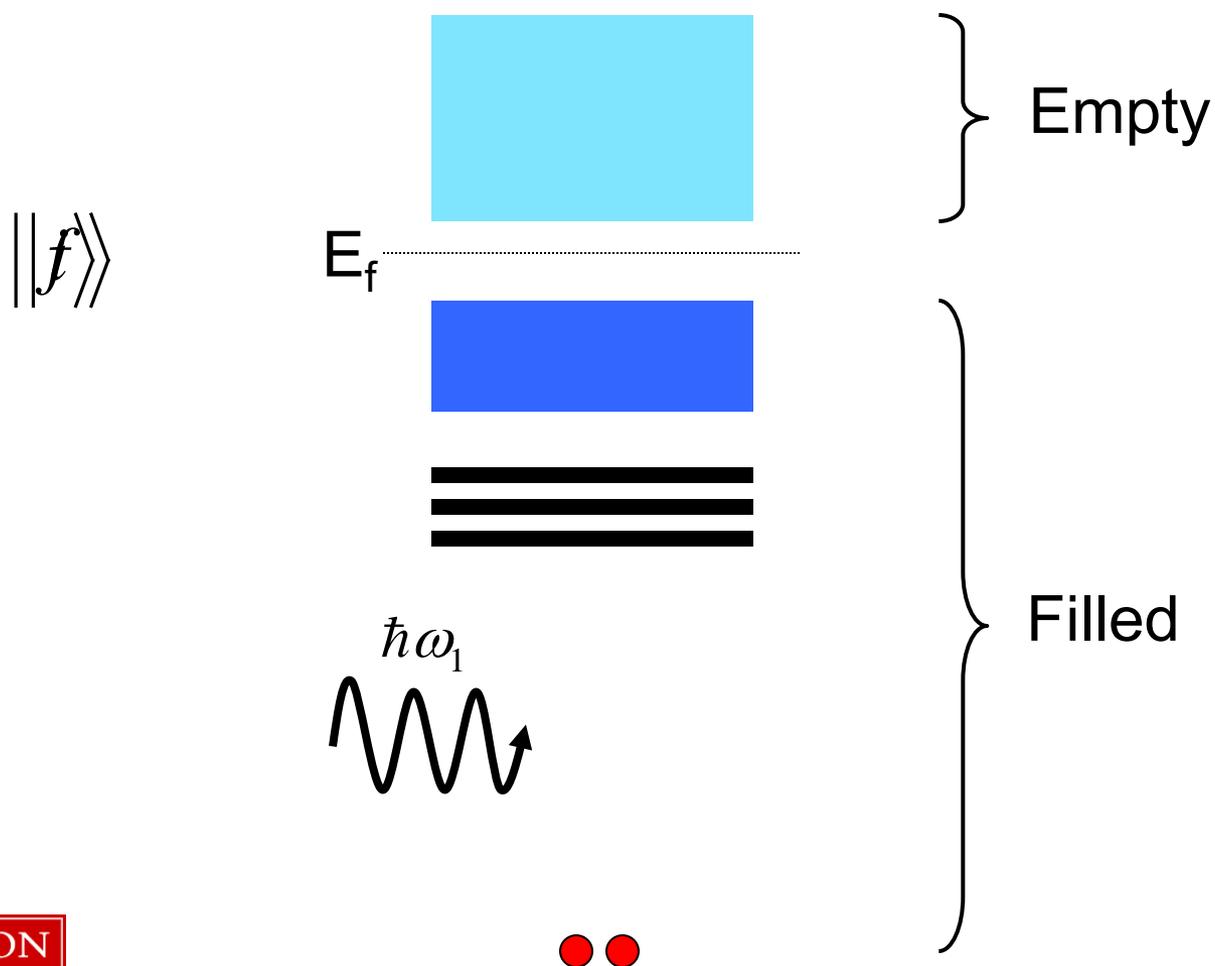
Overview

- High quality thin films
- Temperature dependant
- X-ray at the N K- and Gd M-edges
 - Absorption
 - Emission
 - Resonant emission

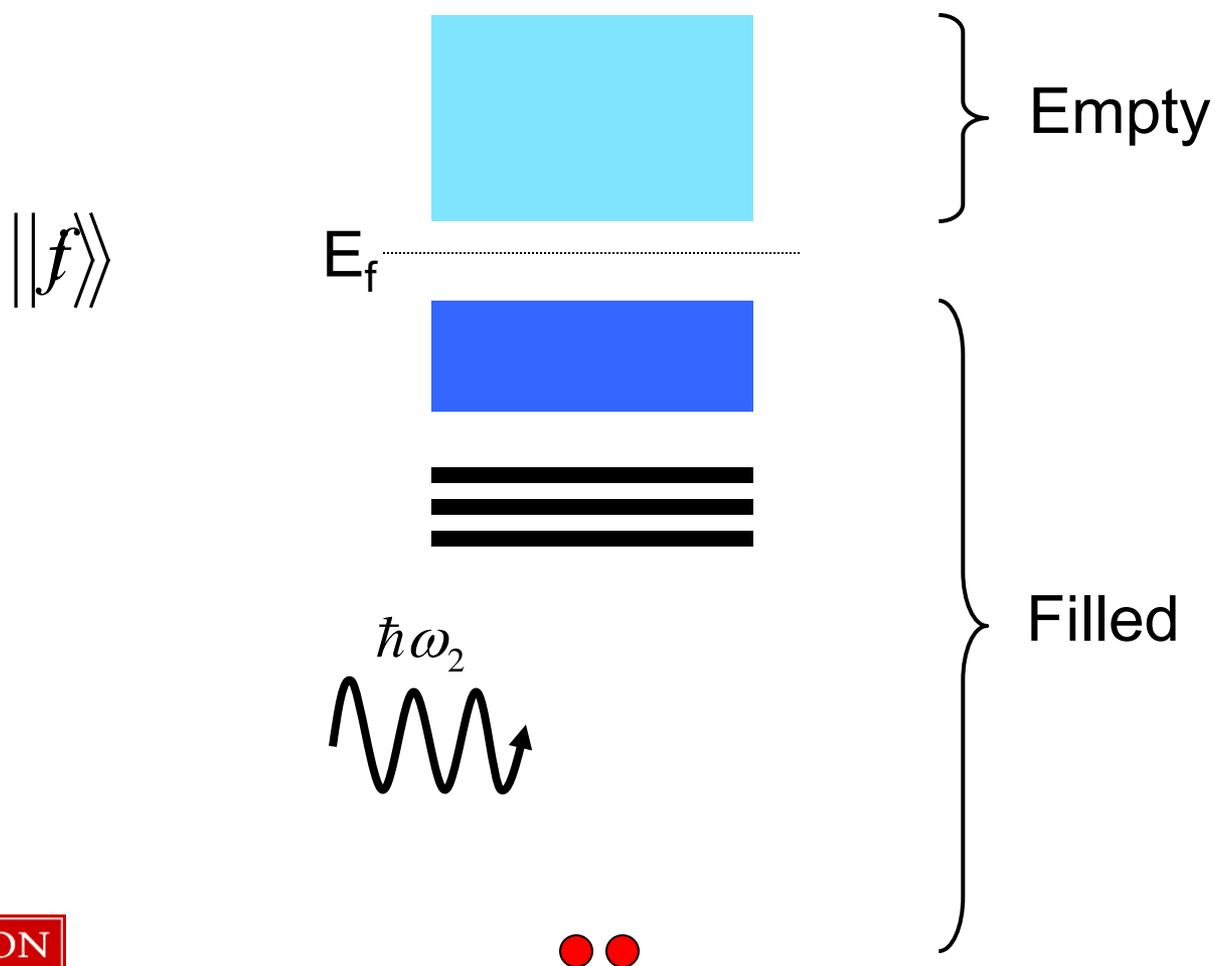
GdN

- Half-filled $4f$ shell
- Phys. Rev. B 73, 235335 (2006)
 - Semiconducting
 - Ferromagnetic 70 K
- Phys. Rev. B 76, 085211 (2007)
 - Optical redshift
- J. Appl. Phys. 106, 063910 (2009)
 - Epitaxial GdN
 - $n \sim 4 \times 10^{20} \text{ cm}^{-3}$
 - Negative magnetoresistance
 - YSZ capping layer

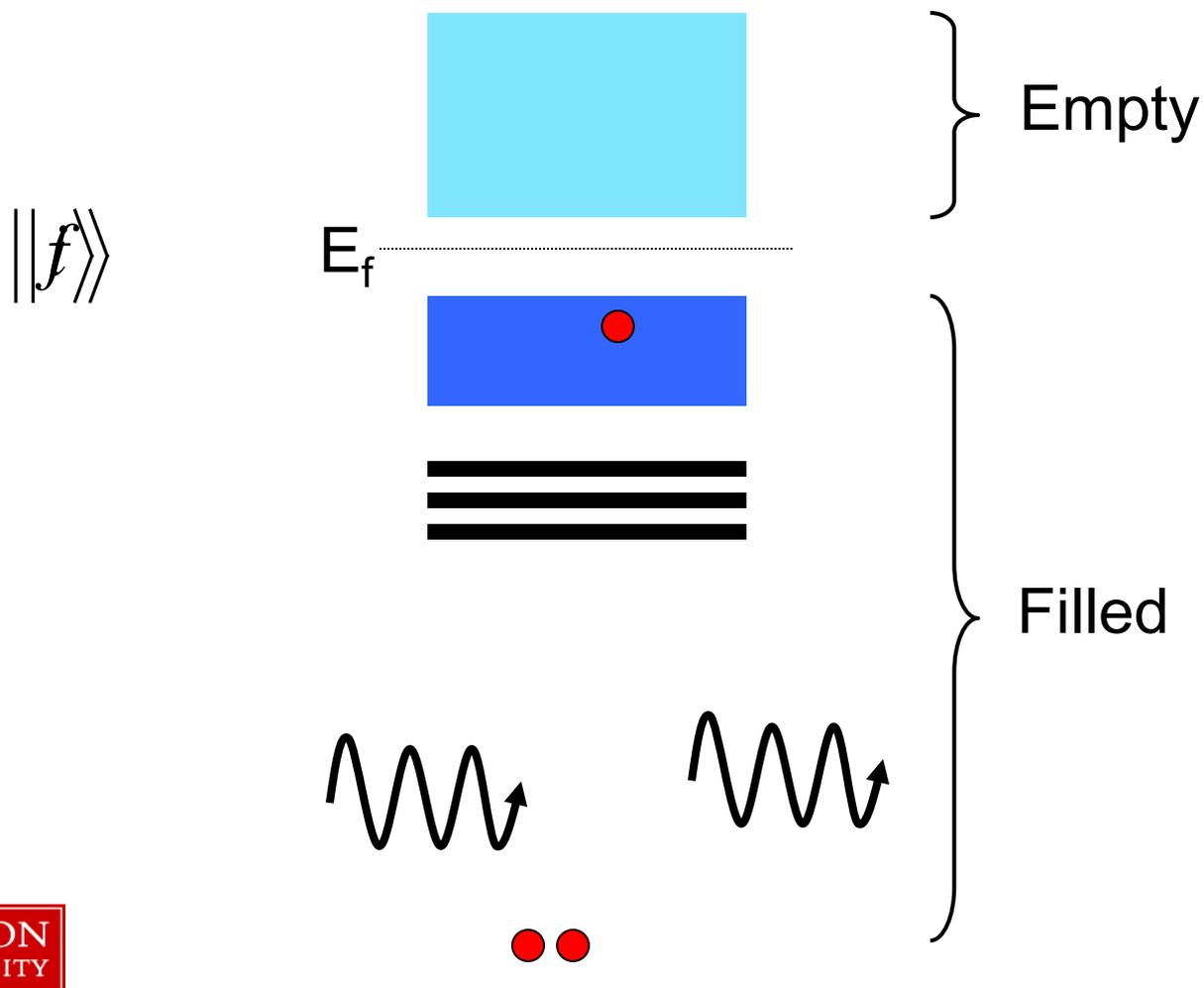
X-ray absorption (XAS)



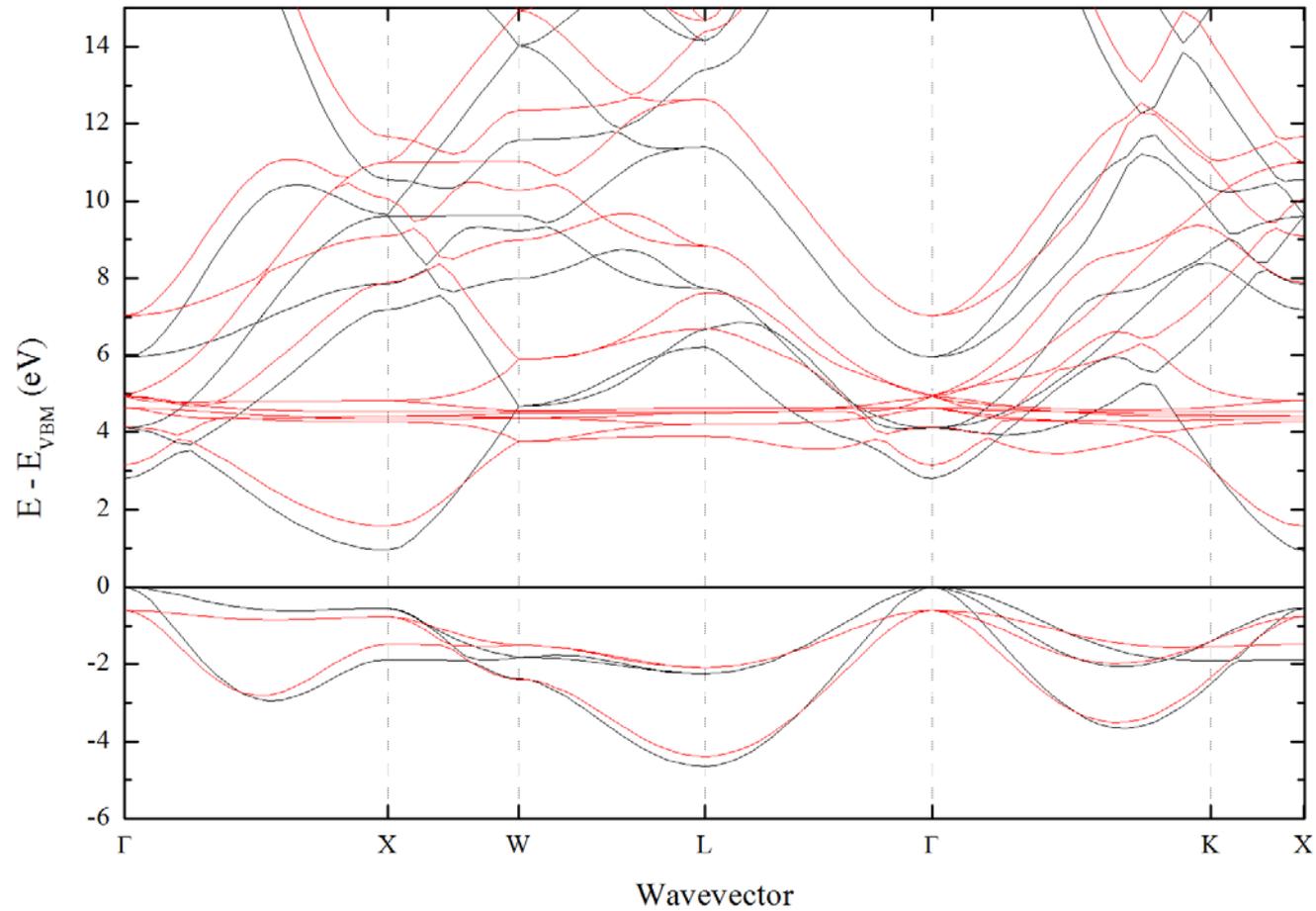
X-ray absorption (XAS)



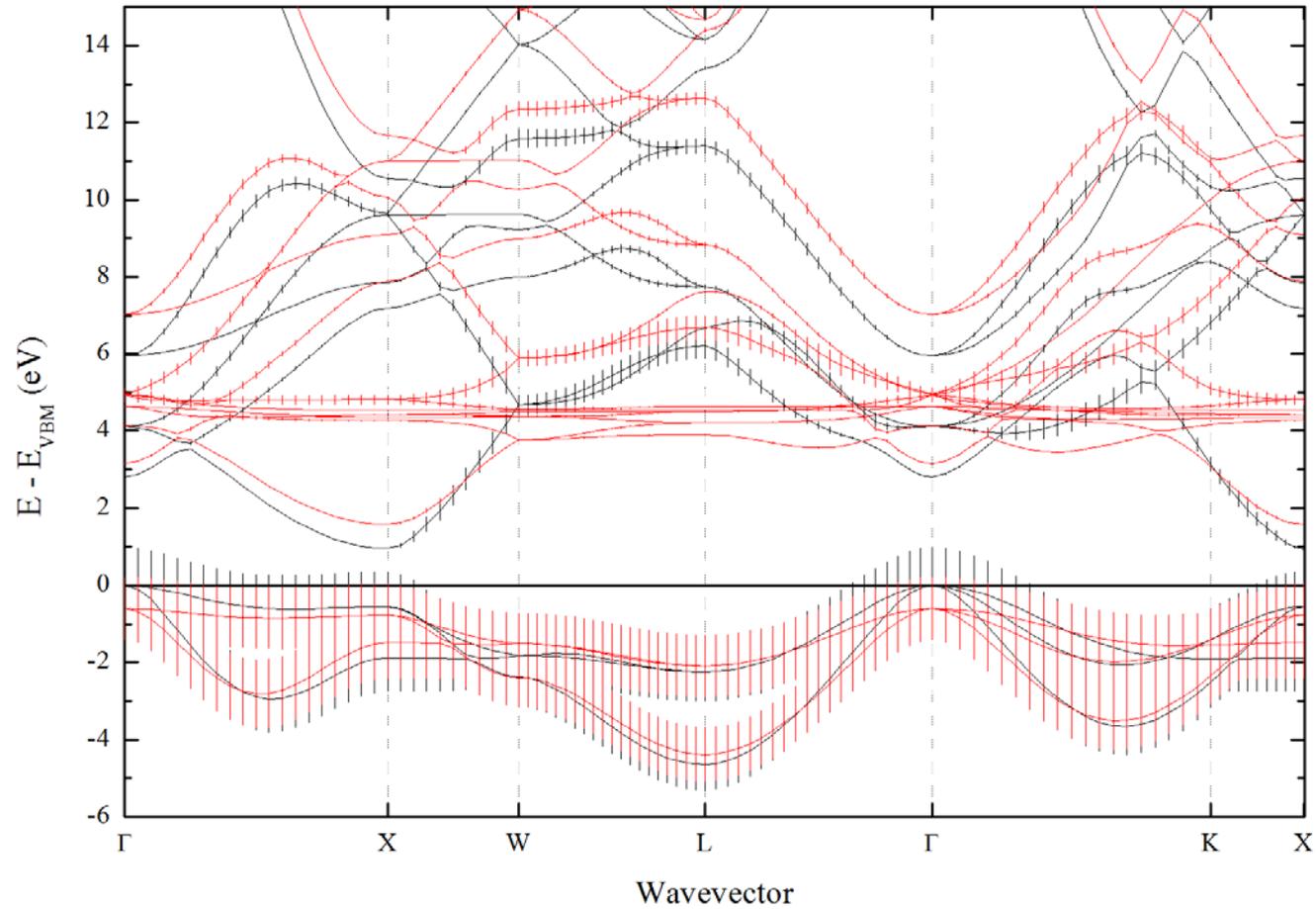
X-ray emission (XES)



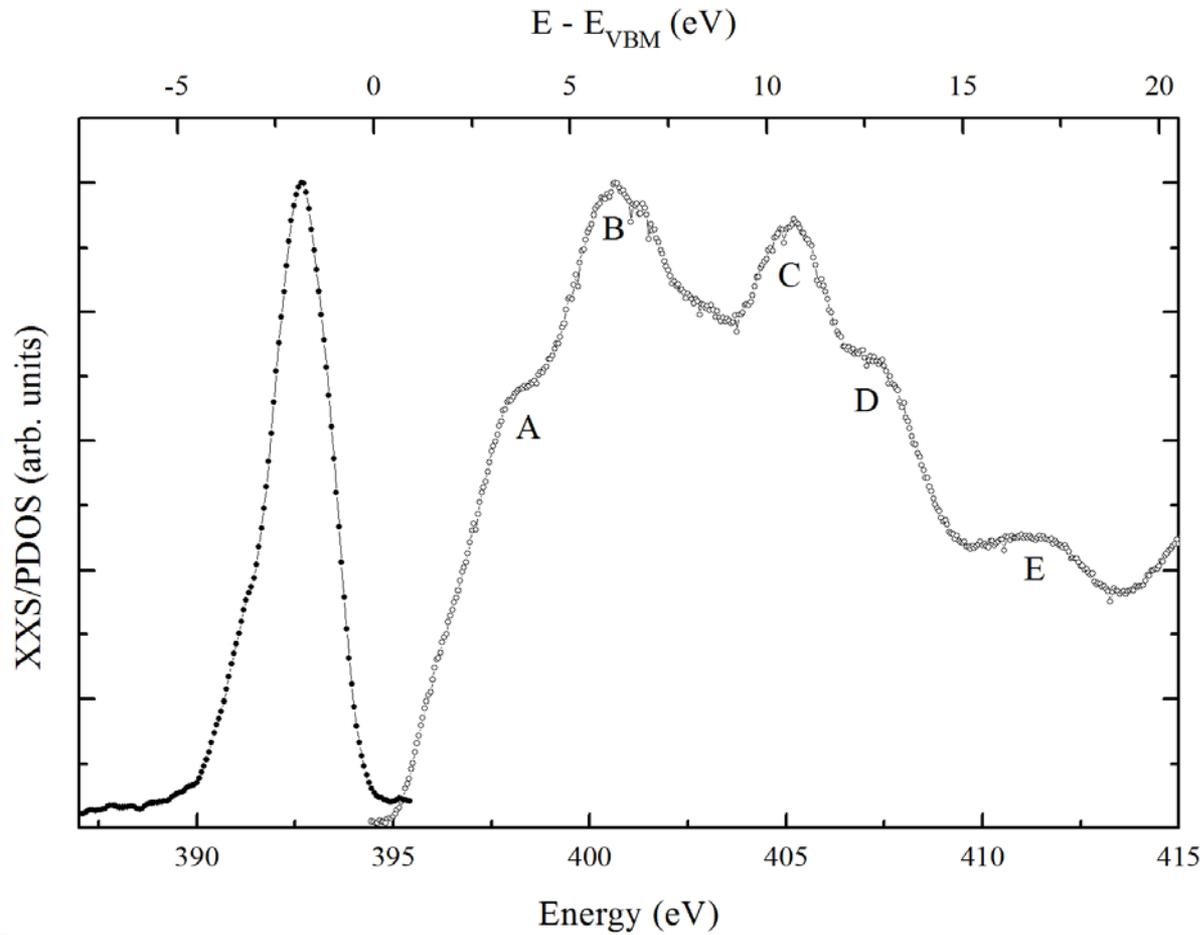
Band structure



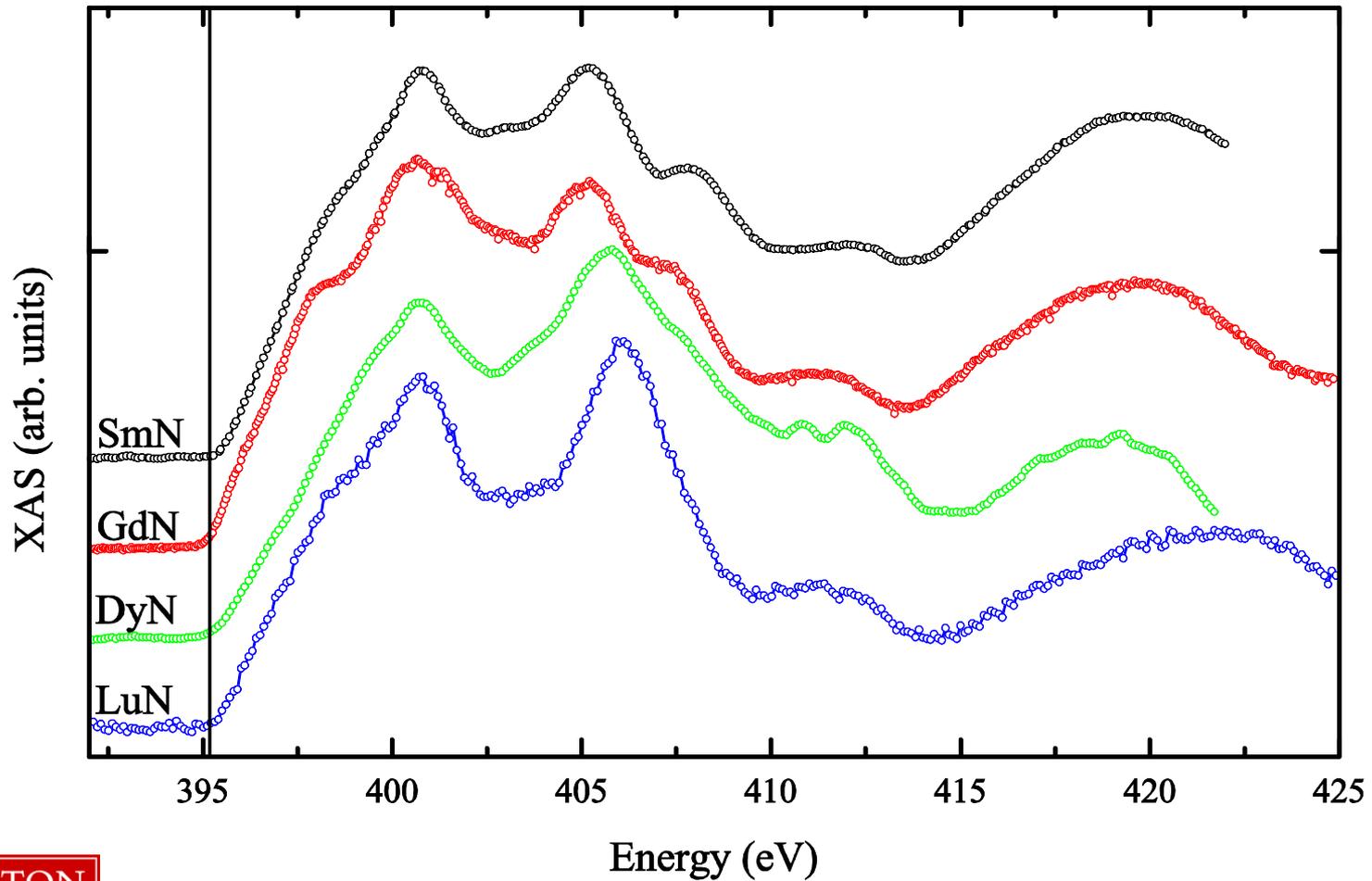
Band structure



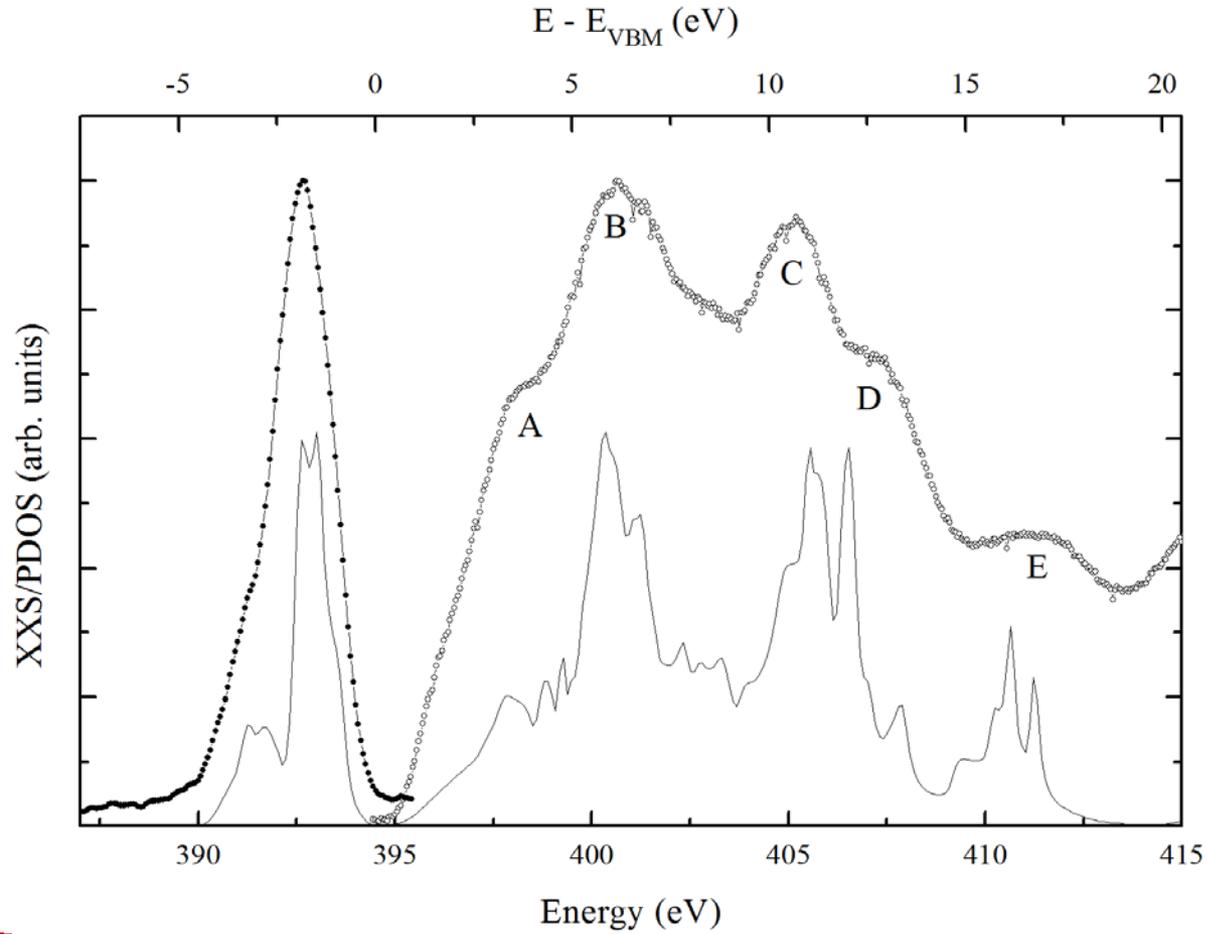
N K-edge XXS



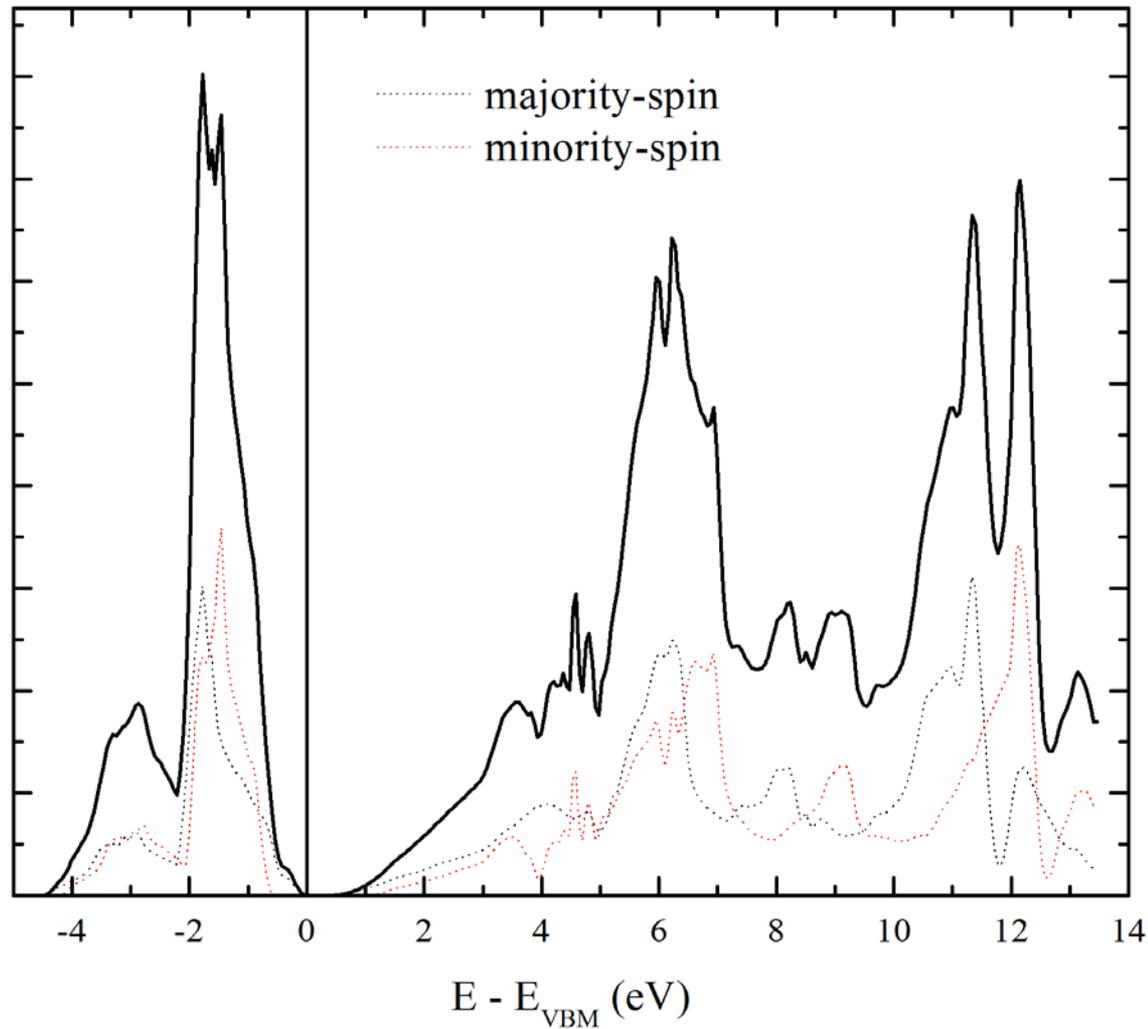
ReN N K-edge XAS



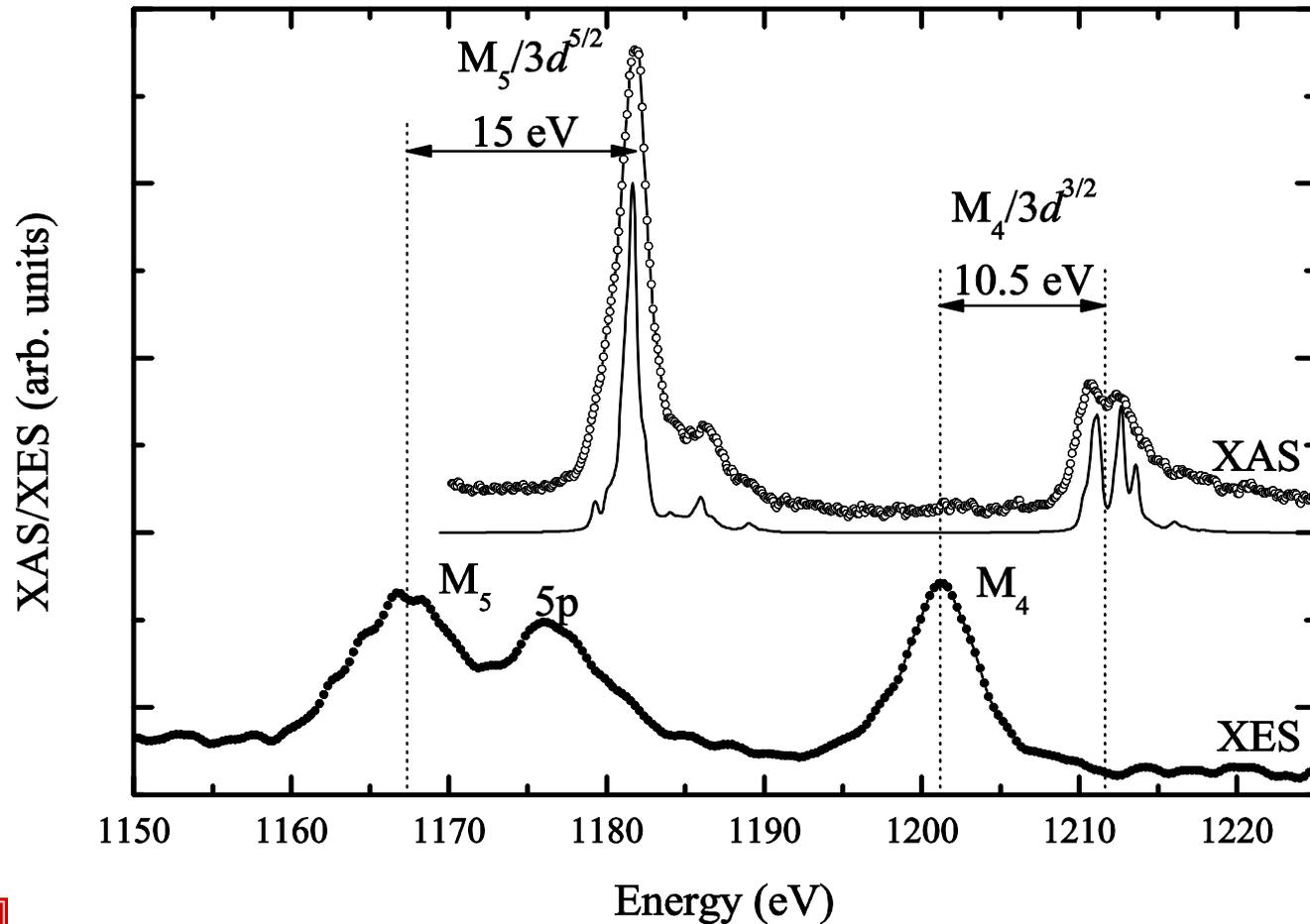
N K-edge XXS



Spin-resolved PDOS



M-edge XAS and XES



Thanks

- Appl. Phys. Lett. *submitted*