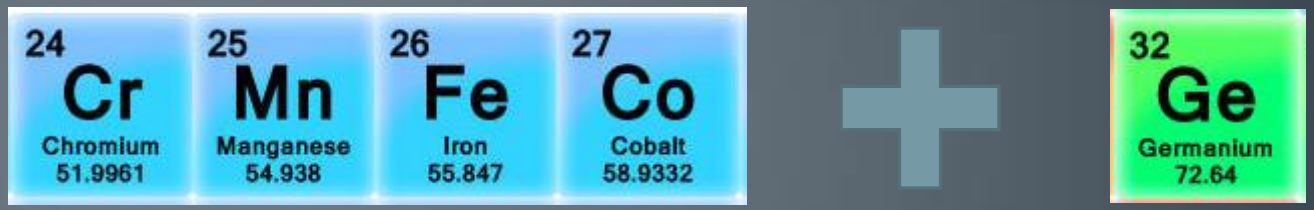
Electronic and Magnetic Properties of MnGe

Mitchell Brickson
Mentor: Dr. Dana Browne

Research Focus

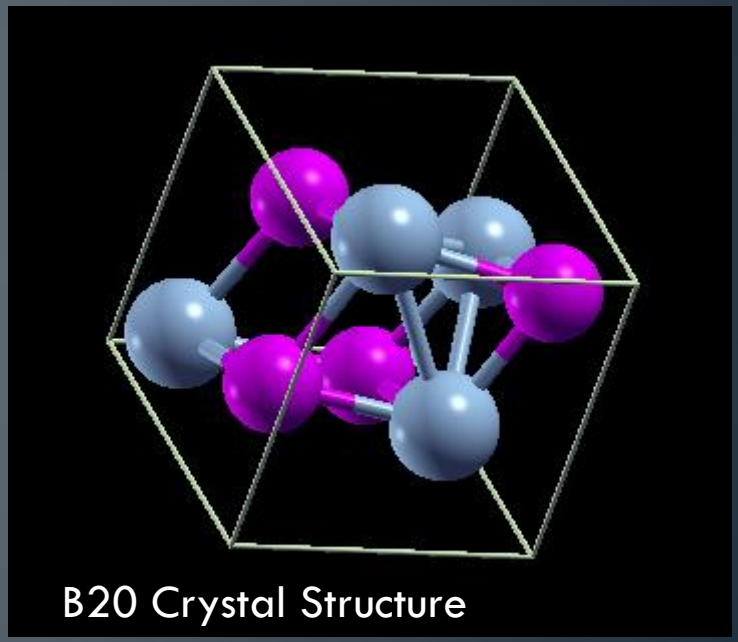
- Main focus of my research: transition metal germanides



- Calculations using Density Functional Theory on mostly manganese germanide

Why it's Interesting

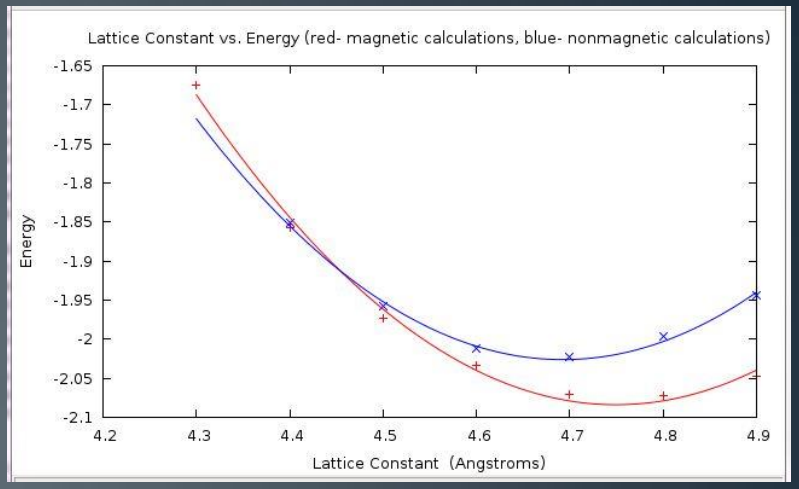
- Strong electron-electron interactions
- B20 crystal structure
- Chiral (no inversion symmetry)
- Interesting magnetic topology

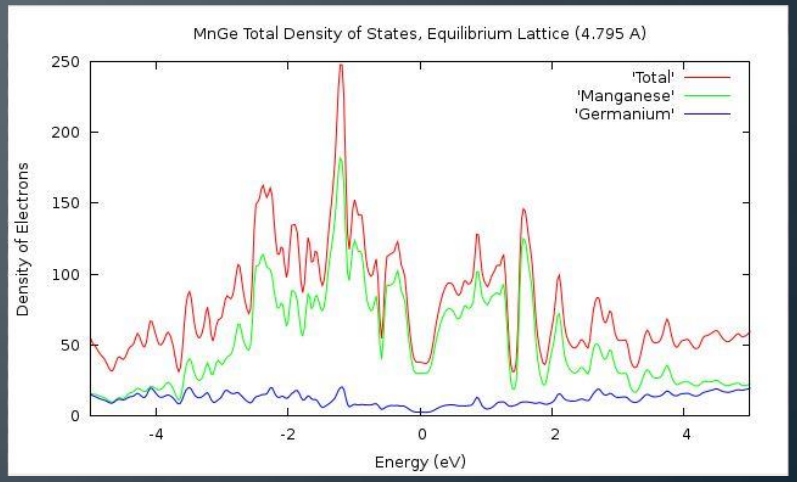


B20 Crystal Structure

Results

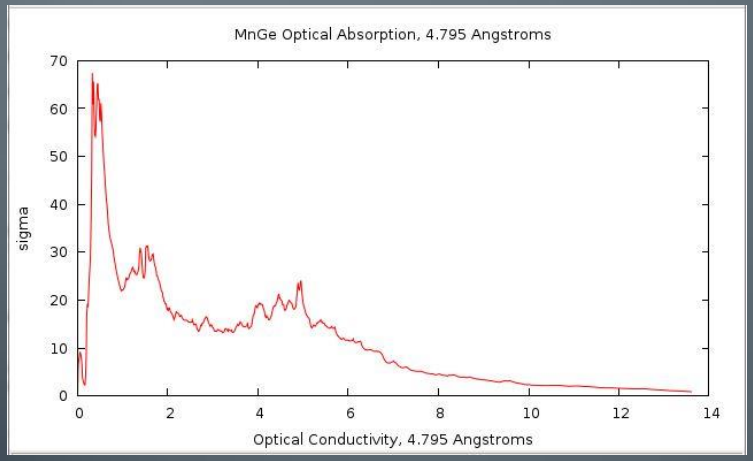
- Ground state is magnetic
- DOS near E_F comprised predominantly of Mn d-orbitals
- Small contribution from Ge p-orbitals 1-8 eV away from E_F

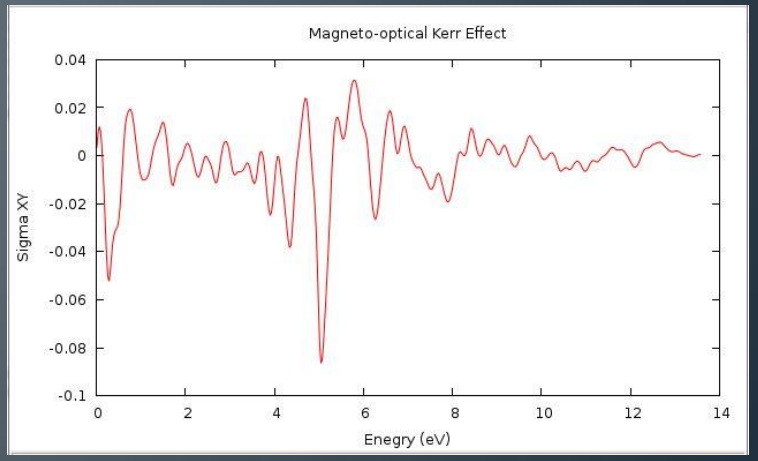




Results continued

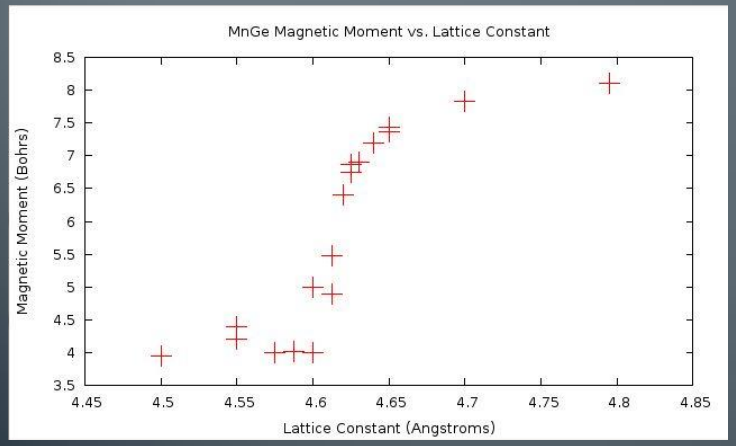
- Calculated many things that can be measured experimentally in some way: optical conductivity, magneto-optic Kerr effect, Fermi surface, magnetization

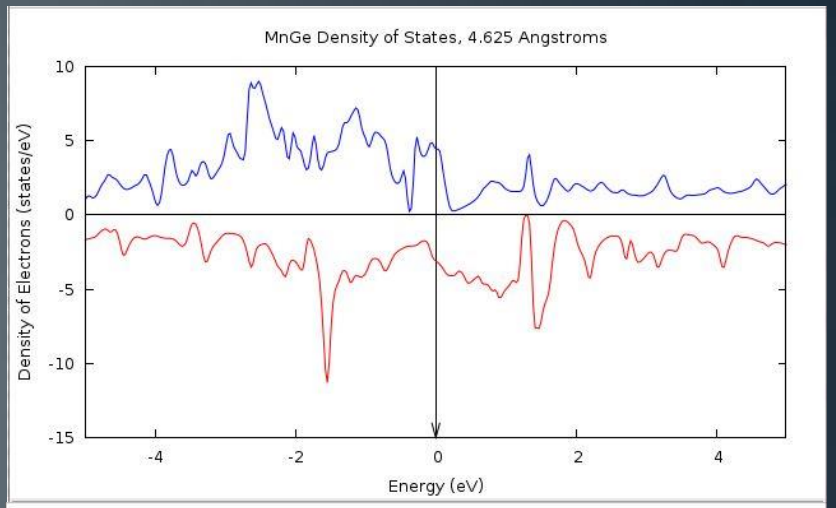


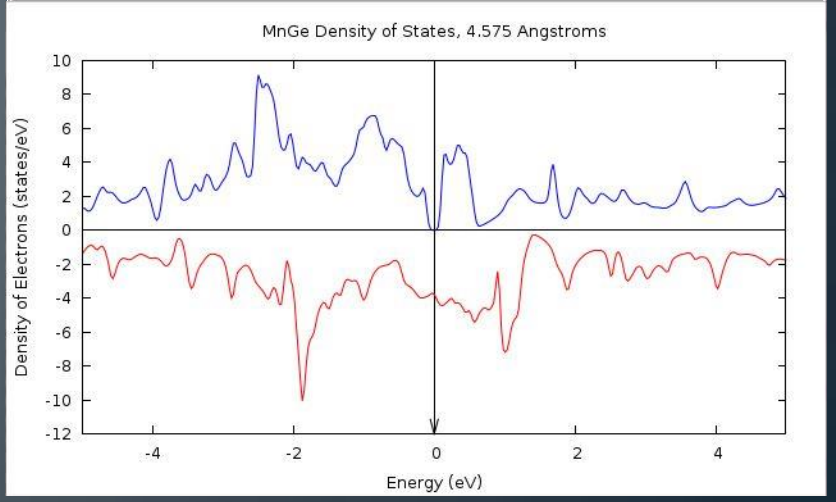


Magnetic Transition

- Under pressure, the magnetic structure of MnGe changes
- Magnetic moment drops to half







Acknowledgements

- Mentor, Dr. Dana Browne
- For experimental interest and useful conversations, Dr. John DiTusa
- Software: WIEN2k, GNUplot, IDL