Part III

Insulator to Superconductor Transition

Seeds of pairing found in the insulator

Band insulator to SC:

Loh, Randeria, Trivedi, Chen, Scalettar, Phys. Rev. X 6, 021029 (2016)

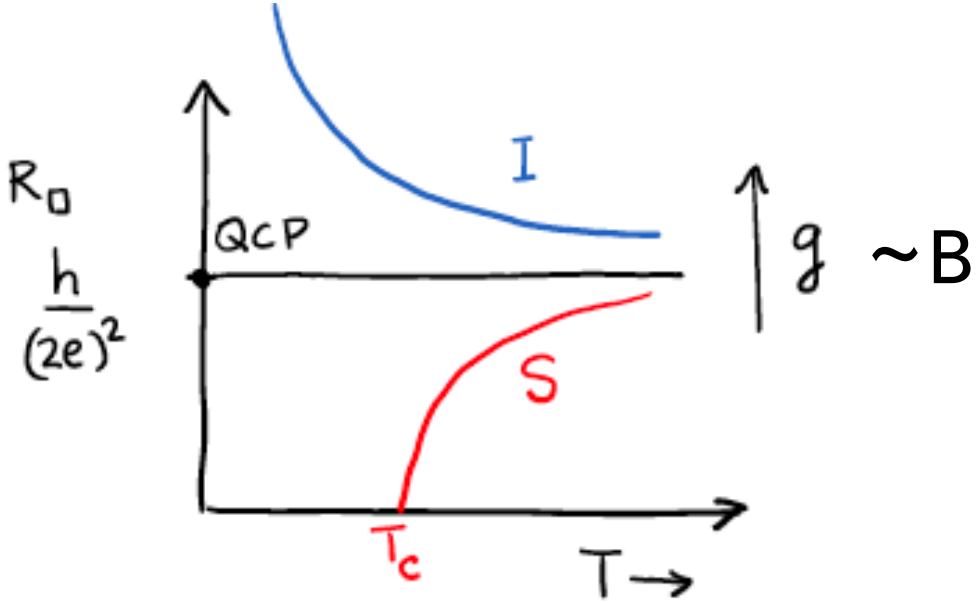
Disorder driven SC to Insulator:

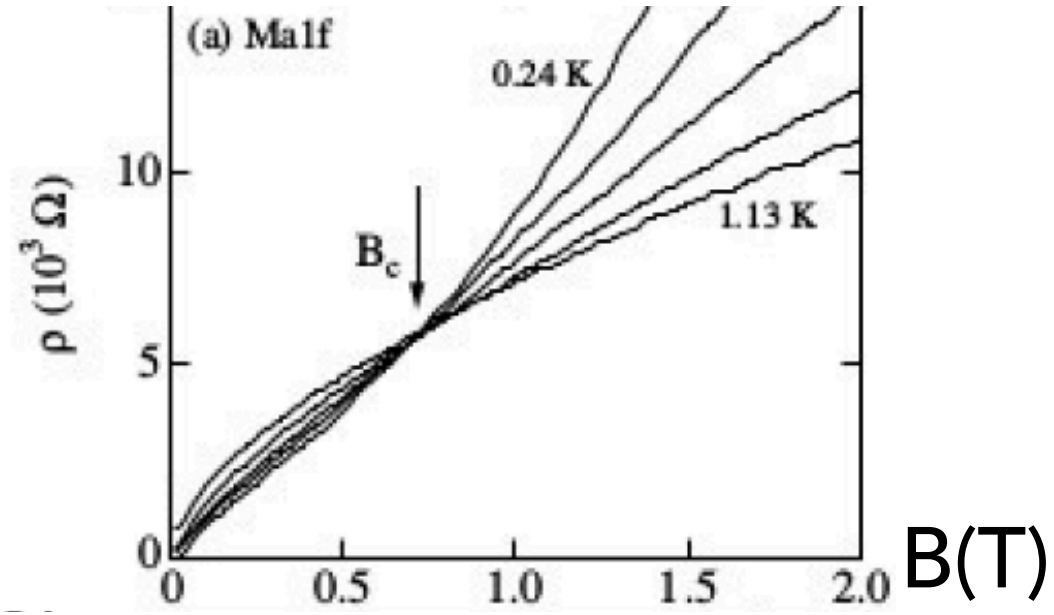
Ghosal, Randeria, Trivedi, PRB 65 014501 (2001); PRL 81 3940 (1998)
Bouadim, Loh, Randeria, Trivedi, Nat. Phys. 7, 884 (2011)

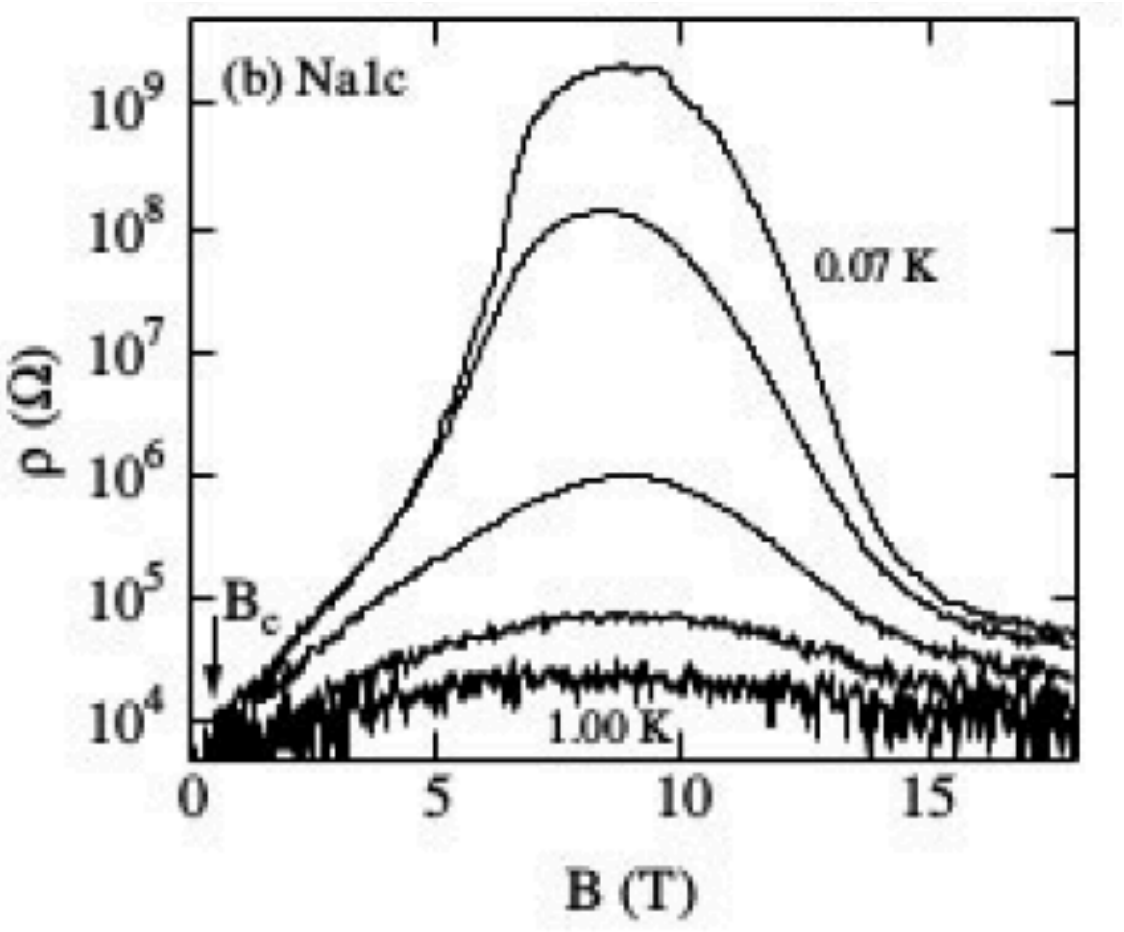
Magnetic field driven SC to insulator:

Anushtree Datta, Anurag Banerjee, Trivedi, Amit Ghosal, preprint

Huge magnetoresistance in disordered insulator: *Why?*



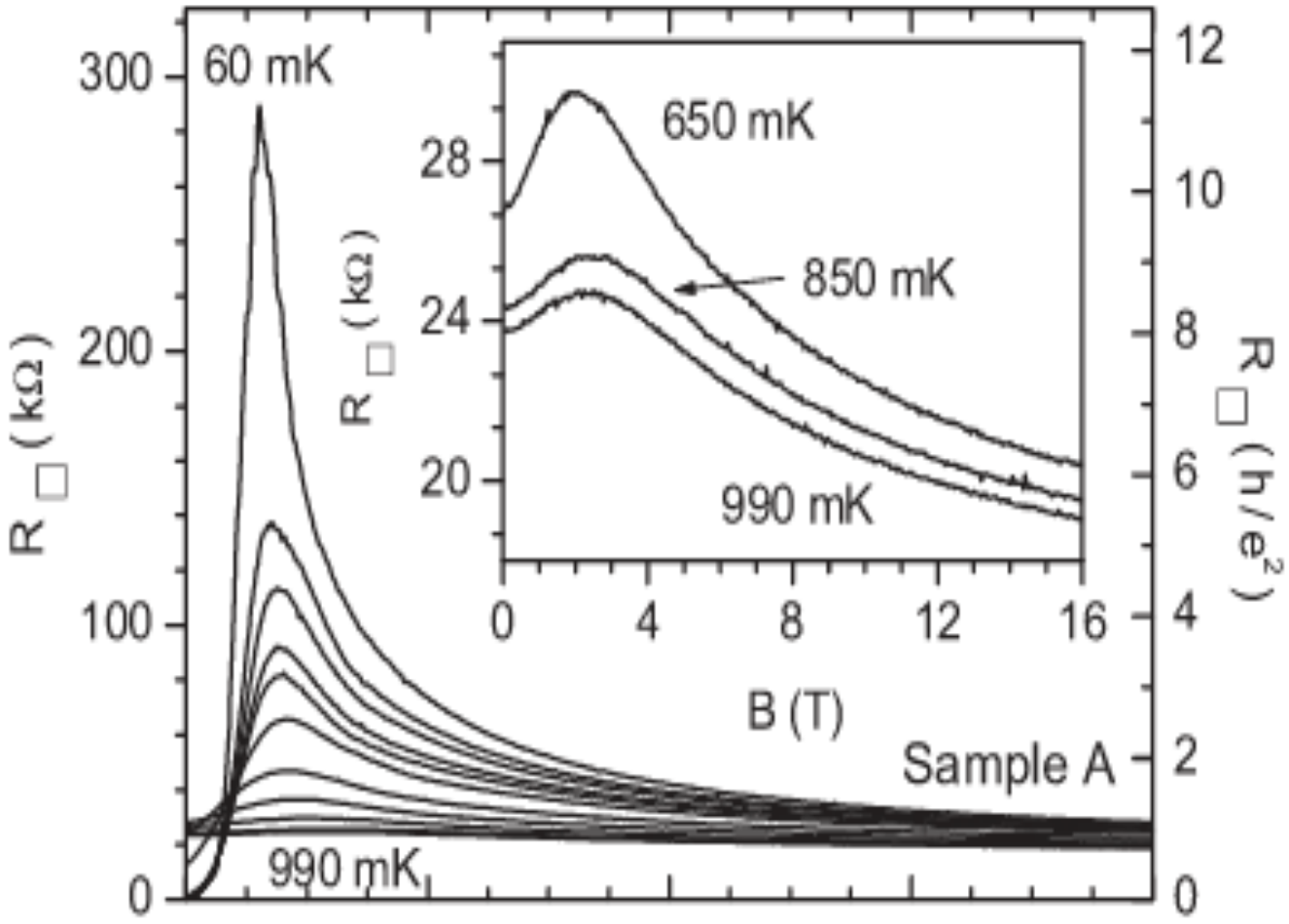




Sambandamurthy, Engel, Johansson, Shahar, PRL 92, 107005 (2004).

Huge magnetoresistance in disordered insulator: *Why?*

TiN

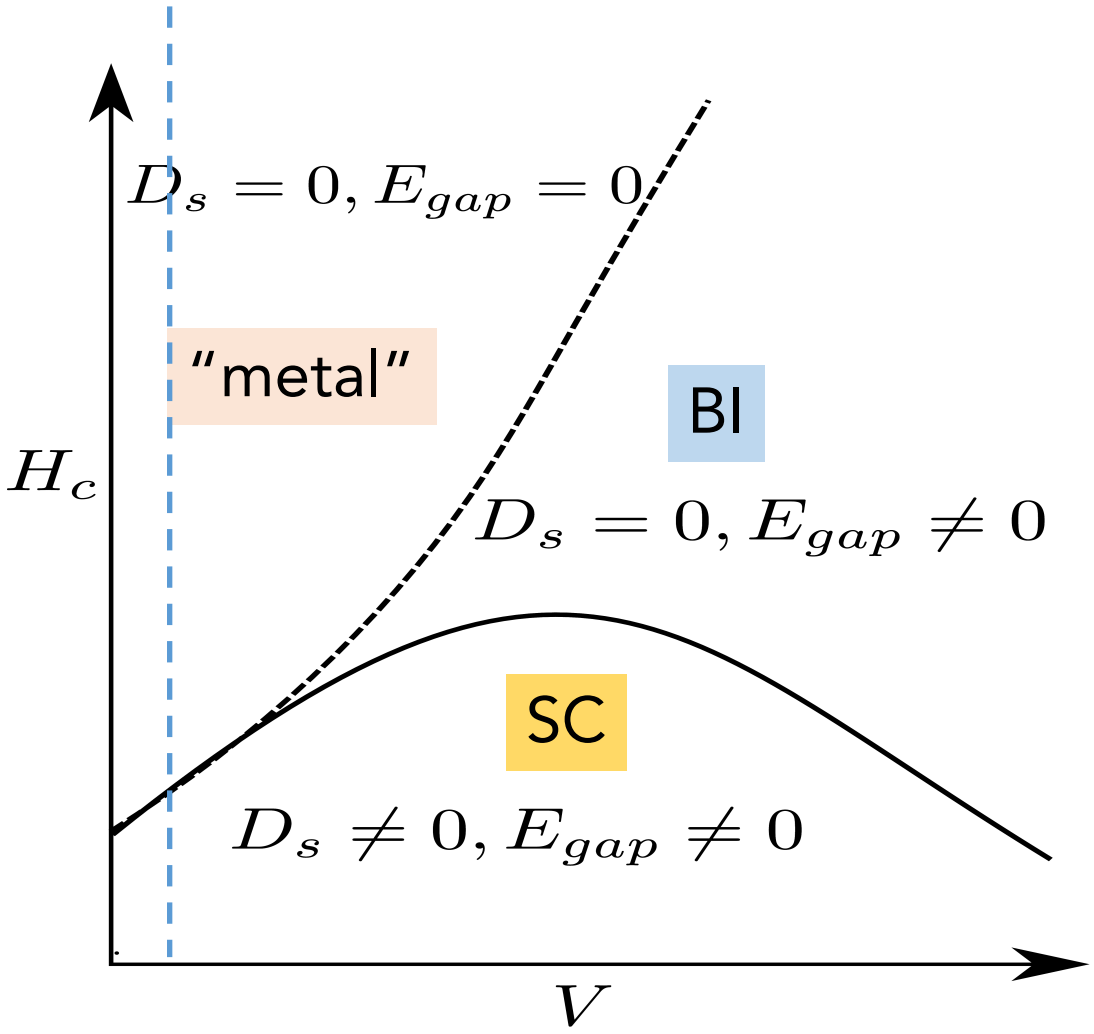


B(T)

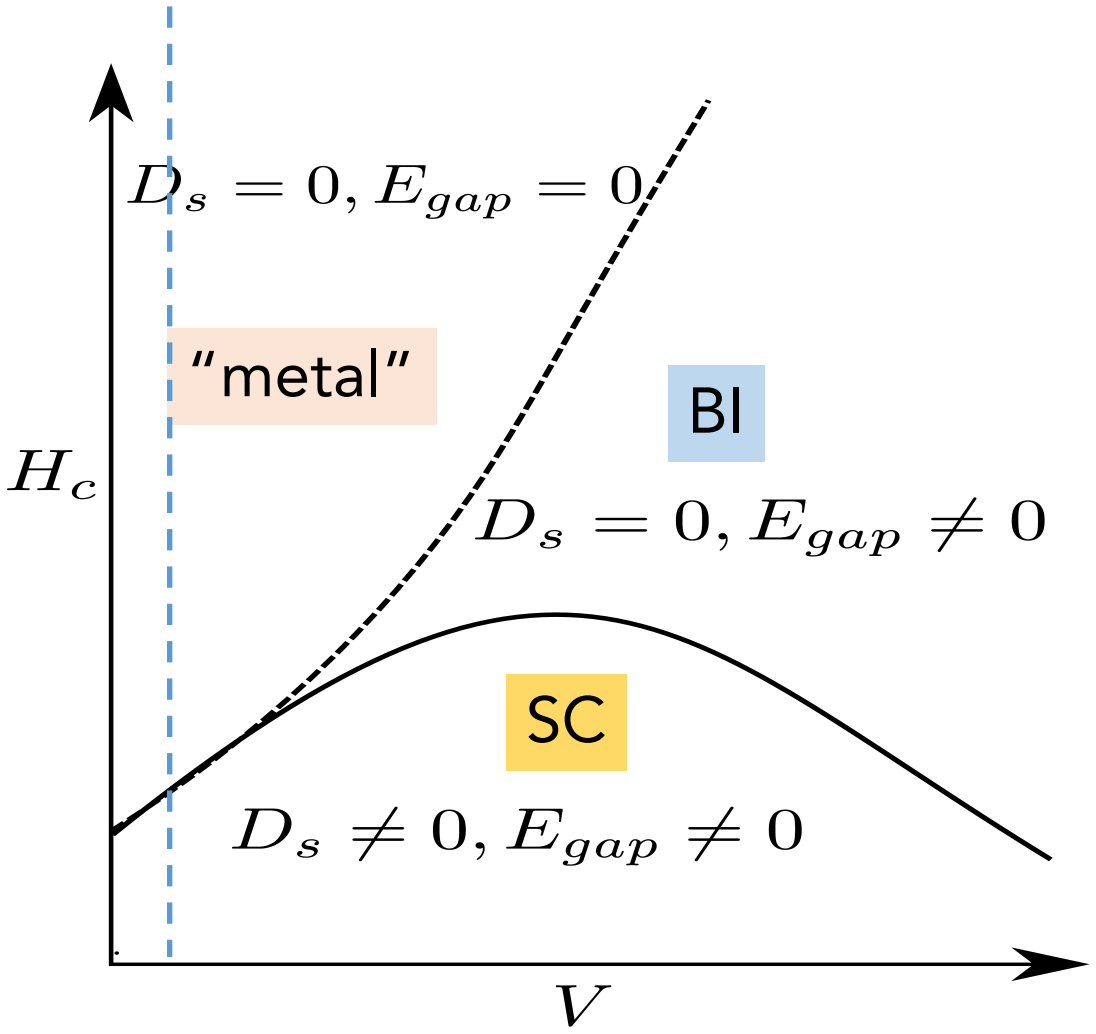
- Peak is asymmetric
- rises sharply near the critical point
- Peak height grows with disorder

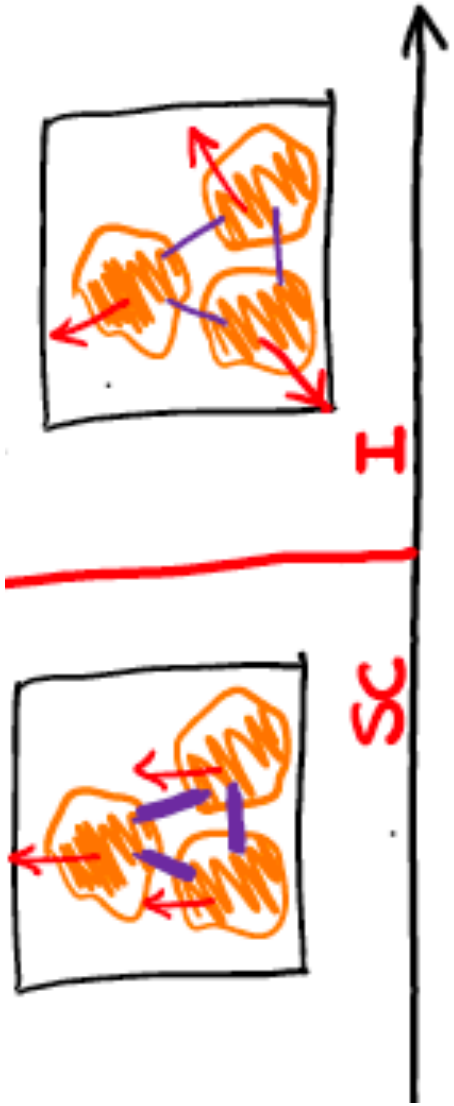
Baturina, Strunk, Baklanov, Satta, PRL 98, 127003 (2007)

Abrikosov to Josephson vortices

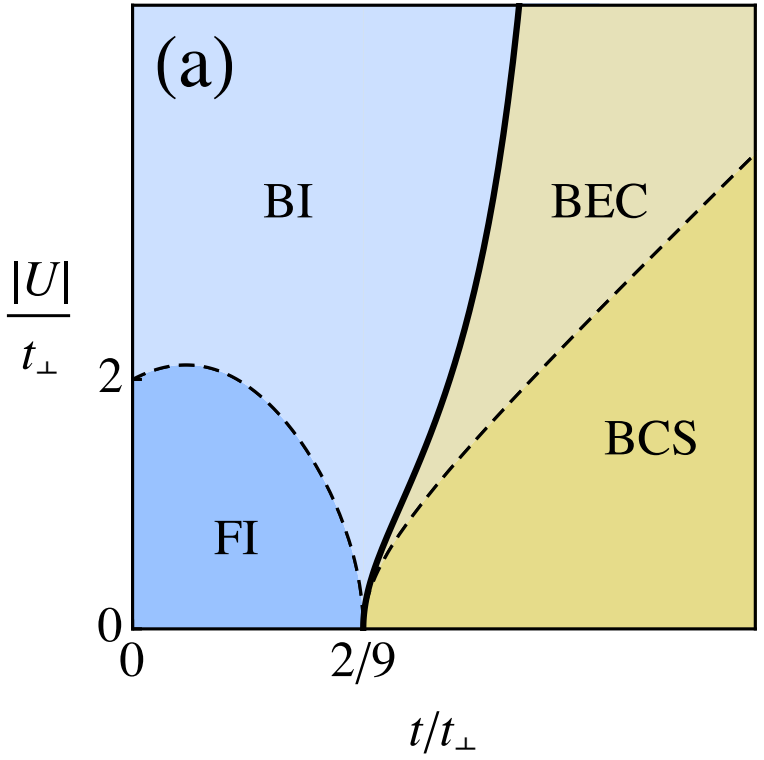


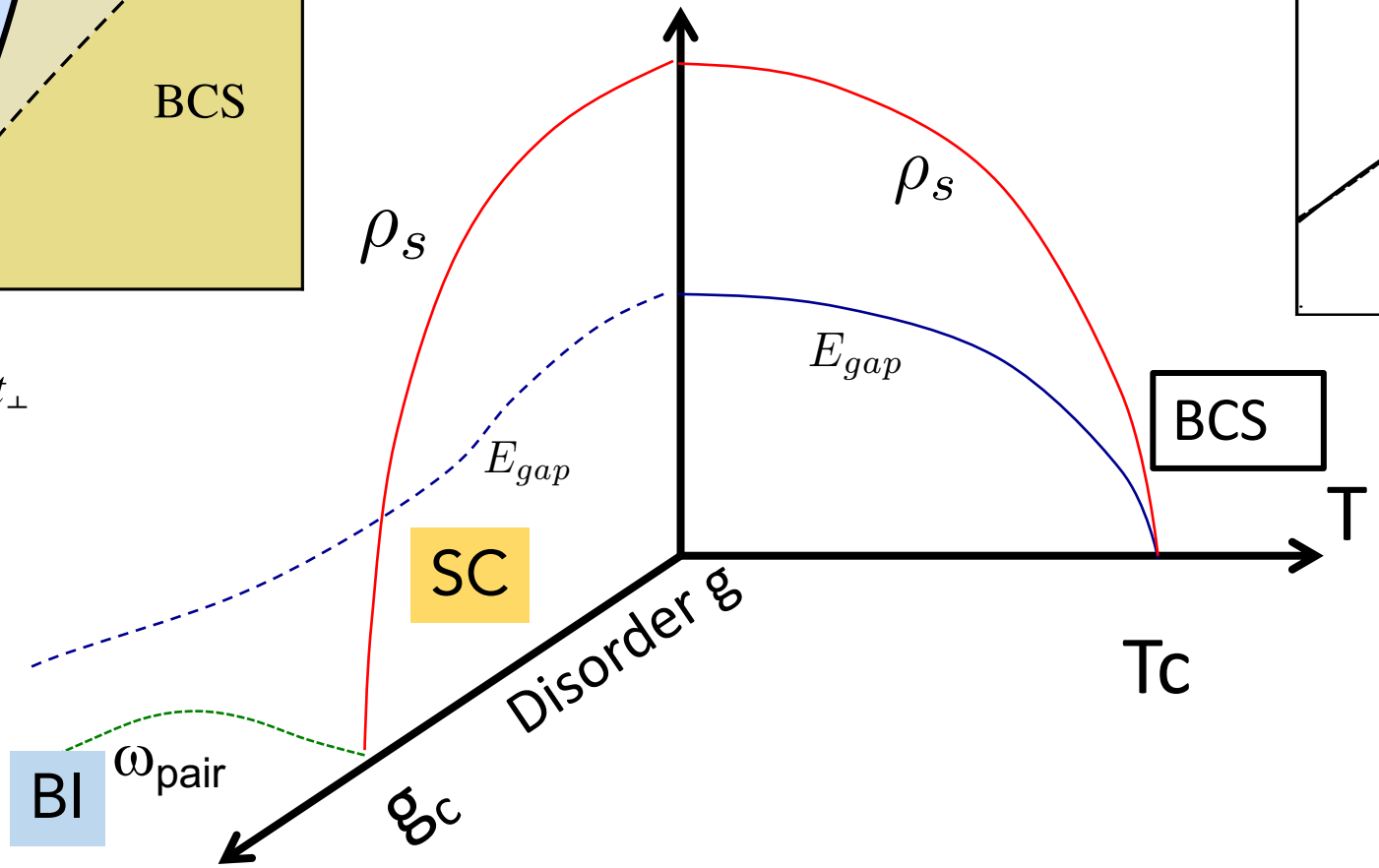
Abrikosov to Josephson vortices

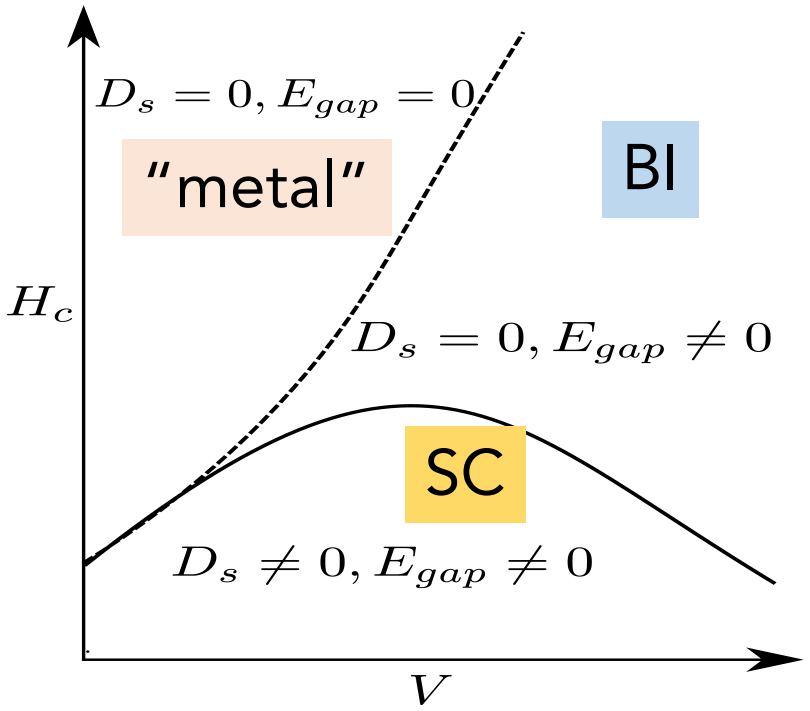




Conclusions: SIT and Broken Paradigms







The End