序幕

一場知識的饗宴

有萌的

凝(聚)態物理

一個範圍極廣並且與實驗關連性極強的領域

What is Condensed Matter Physics?

From Wikipedia

- Condensed matter physics is the field of physics that deals with the macroscopic physical properties of matter. In particular, it is concerned with the "condensed" phases that appear whenever the number of constituents in a system is extremely large and the interactions between the constituents are strong.

- The most familiar examples of condensed phases are solids and liquids, which arise from the bonding and electromagnetic force between atoms. More exotic condensed phases include the superfluid and the Bose-Einstein condensate found in certain atomic systems at very low temperatures, the superconducting phase exhibited by conduction electrons in certain materials, and the ferromagnetic and antiferromagnetic phases of spins on atomic lattices.

Historically

Condensed matter physics grew out of solid-state physics, which is now considered one of its main subfields. The term "condensed matter physics" was apparently coined by Philip W. Anderson when he renamed his research group - previously "solid-state theory" - in 1967. In 1978, the Division of Solid State Physics at the American Physical Society was renamed as the Division of Condensed Matter Physics. Condensed matter physics has a large overlap with chemistry, materials science, nanotechnology and engineering.

Cont'd

CMP started from the 50s -70s and got matured after the 80s.

50s -70s

- Quasiparticles – Landau-Fermi Liquid Theory
- Field-Theoretical Method – Green's Function
- Broken Symmetry – Phase Transition & Critical Phenomena
- Scaling – Renomalization Group

After 80s

- Quantum Hall Effect – Integer and Fractional
- High Temperature Superconductors – Cuprates and Others
- Spin Glasses, DMS, and Conducting Polymers
- Novel Low-Dimension Functional Materials – Graphene, TMDs
- Topological Insulator and Topological Superconductor – Spintronics and Quantum Computing
- Many more will come soon