

清华学堂物理班 海外学者短期讲学



Introduction to Quantum Field Theory of Condensed Matter Systems

授课教师: 吴詠时, 美国犹他大学物理系教授

授课时间: 6月24日-8月2日每周一、三、五第二大节 (9:50-11:25)

授课地点: 6月24日-6月28日在理科A112, 6月29日-8月2日四教4204

课程简介

This mini-course will be taught entirely in English, for advanced undergraduate and graduate students. The goal is to introduce students to Quantum Field Theory with emphasis on applications in condensed matter systems. Quantum field theory has been known to be the foundational framework for the Standard Model in particle physics. In recent years it has also become a powerful formalism to formulate the effective theory of many condensed matter systems in the quantum regime at large distances. It is the belief of the lecturer that the progress (both in concepts and in techniques) in QFT of condensed matter systems will become relevant, important, perhaps even crucial, to future advances in fundamental physics.

Part I "Quantization Methods" will briefly introduce Second Quantization and Path Integral approaches for a quantum many-body system.

Part II "Weakly Interacting Bosonic Systems and Superfluids"

Part III "Weakly Interacting Fermionic Systems and Fermi Liquids"

Part IV "Gauge Theory and Topological Phenomena"

授课教师简介

吴詠时: 美国犹他大学教授, 世界著名理论物理学家。研究兴趣广泛, 研究领域涵盖粒子物理、凝聚态物理、数学物理等。美国物理学会会士, 以思想深刻、讲课清晰而著称。他曾经在10年前在清华给研究生和本科生讲过这门课。当年祁晓亮、刘朝星等一批清华“土博士”(如今担任美国著名大学的助理教授), 王靖等一批清华本科生从中受益匪浅。吴詠时本人也对清华学生的高水准而印象深刻。如今他再度为清华物理系的研究生和清华学堂物理班高年级本科生上这门课, 增加了这十年中的新发展, 无疑将使我们学生再度受益。