# 学术报告

**报 告 题 目: Pairing fermions with population imbalance**

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**报告时 间: 2013年12月17日10:00**

**报告地 点: 物理系三楼报告厅**

## 报告摘要

*Cooper pairing of fermions starts usually from the premise that the two species forming pairs have equal populations, i.e., that their particle numbers are the same. That need not always be the case, though, and examples to the opposite are known. They concern superconducting metals, as well as dense quark matter, nuclear matter or ultra cold atoms.*

*The simplest case is that of a superconductor when a Zeeman term is added to the Hamiltonian. We will show that the Zeeman energy may result in breaking of translational invariance and hence in inhomogeneous superconducting ground states. Simple arguments will be presented which explain the origin of the symmetry breaking.*

*Experiments on CeCoIn5, and the two-dimensional organic superconductors κ -(BEDTTTF)$_2$ •Cu(NCS)$_2$, λ-(BETS)2 FeCl4, as well as cold atoms provide strong evidence that an inhomogeneous state is forming in high magnetic fields. However, the most important realization of inhomogeneous states is found in pi junctions, which seem to be on the verge of important technical applications. We will briefly describe progress which has been made here, based on ideas of Bulaevskii, Buzdin and others and realized by Ryazanovet al. and others.*

## 报告人简介

- Born on 6th April, 1936 in Breslau
- Study of physics at Humboldt Univ. Berlin, in Göttingen and Hamburg, doctorate Univ. of Maryland (1963)
- Full Professor of Physics, Frankfurt Univ. (1968-71)
- Director at the Max Planck Institute for Solid-State Research (1974-93)
- Founding Director and Scientific Member at the Max Planck Institute for the Physics of Complex Systems (1993-2007)
- Member of the Leopoldina - National Academy of Sciences, Halle (since 1995)
- Member of the Deutsche Akademie f. Technikwissenschaften (acatech) (since 2002)