Theory of Superconductivity and Superfluidity (T) - physics7504

Course	**Theory of Superconductivity and Superfluidity (T)**
Course No.	physics7504

Category	**Type**	**Language**	**Teaching hours**	**CP**	**Semester**
Elective	Lecture with exercises	English	2+1	5	WT/ST

Requirements:

Preparation: Quantum Mechanics, Thermodynamics and Statistics, Quantum Field Theory

Form of Testing and Examination: Requirements for the (written or oral) examination: Successful participation in the exercises

Length of Course: 1 semester

Aims of the Course: The goal of the course is to introduce students to the theory of superconductivity and superfluidity.

Contents of the Course: Phenomenological theory of basic superconductivity, type I and type II superconductivity, vortices and their dynamics, Meissner-Ochsenfeld Effekt, microscopic theory of superconductivity: Gor'kov equation, BCS theory, Migdal theorem, strong coupling theory of superconductivity: Eliashberg equation, Andreev scattering, Josephson effect, Anderson theorem: impurity scattering, Collective excitations in superconductors and superfluids, Anderson (Higgs) mechanism for the mass generation. Superfluidity in 3He, superconductivity in heavy fermion compounds, high temperature superconductivity and open questions.

Recommended Literature: Will be announced in the first lecture

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