

Subject (English)	Quantum Field Theory		Semester	Fall	Day/Slot	Fri./3 rd 13:00-14:30	
科目名 (日本語)	場の量子論						
Course Code	VJ216F53	Course Numbering	SPH-PHY501		Period	Oct. 5, 2018 - Jan. 25, 2019	
Instructor (Post)	Riichiro SAITO (Prof.)				Campus	Aobayama	
					Building	Science Complex B [H-03]	
Faculty	Faculty of Science		Credits	2	Class Room	745	
Class subject	Quantum field theory						
Object and summary of class	Basic quantum field theory and its application to solid state physics.						
Keywords	-						
Goal of study	In this class, we will discuss the second quantization in the quantum mechanics. In order to take this class, students should study quantum mechanics, which is mandatory. In particular, if the students are undergraduate students, the students should pass some preliminary examination of quantum mechanics. From subjects of solid state physics, we will discuss some examples of the field theory.						
Contents and progress schedule of class	Starting from quantum mechanics, we discuss quantization of the field in terms of the field theory. We introduce interactions between elementary excitations (or pseudo particles) by perturbation theory. We will discuss time-dependent, perturbative calculations in the solid state physics. <ol style="list-style-type: none"> I. Second quantization in quantum mechanics II. Some examples in solid state physics III. Time evolution in the interaction picture IV. The Dyson expansion and the Wick theorem V. Perturbation theory and the Feynman diagram 						
No.	1	2	3	4	5	6	7
Date	Oct. 5, '18	Oct. 12	Oct. 19	Oct. 26	Nov. 2	Nov. 9	Nov. 16
No.	8	9	10	11	12	13	14
Date	Nov. 30	Dec. 7	Dec. 14	Dec. 21	Jan. 11, '19	Jan. 18	Jan. 25
Preparation	Since it is an advanced class, the contents of the class will be adjusted to the level of students. Nevertheless, you should understand the basic points of quantum mechanics.						
Record and evaluation method	Weekly small examination and some reports. Reports are given by the PowerPoint.						
Textbook and references	Specified in the class.						
Self study	Read some textbooks for fully understanding the subject of field theory.						
In addition	-						