

PHY-M-VF 13

Effective WS 2011/12

1. Module title:		Quantum Theory of Condensed Matter II: Mesoscopic Physics (quantum transport)			
2. Field / responsibility of:		Physics / the faculty, the Dean of Studies			
3. Module contents:		<ul style="list-style-type: none"> • Fundamental concepts and phenomena • Drude model, Kubo formalism and conductivity • Non equilibrium Green's function formalism <ul style="list-style-type: none"> - applications to steady state transport - relation to the Landauer approach • Density matrix approach to open quantum systems <ul style="list-style-type: none"> - applications to steady state transport - single electron tunnelling , the Kondo effect 			
4. Qualification objectives of the module / competencies to be acquired:		This lecture presents the theory of quantum transport in mesoscopic and low-dimensional electronic systems.			
5. Prerequisites for participation:					
a) Recommended knowledge:		Quantum mechanics II, The structure of matter II			
b) Prerequisite courses:		None			
6. Module can be used for:		MSc. in Physics, MSc. in Nanoscience, MSc. in Comp. Science; BSc. in Nanoscience, BSc. in Computational Science			
7. Module is offered:		On a yearly basis			
8. Module can be completed in:		1 semester			
9. Recommended semester of study:		Minimum: 1			
10. Overall module workload / number of credit points:		Workload: Total number of hours: 240 Allocation: 1. Attendance: 6 credit hours 2. Independent study (including exam preparation/ exam): 150 hours Credit points: 8			
11. The module is successfully completed when the requirements below have been met.					
12. Module components:					
Nr.	Req./req. elective	Form of teaching	Subject area / topic	Credit hours	Coursework
PHY-M-VF 13.1	Required elective	Lecture Practical course	Quantum theory of condensed matter II: Mesoscopic physics	6	Practical exercises

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13. Module exam:					
Nr.	Competence / topic	Type of exam	Duration	Time / notes	Weighting for module grade
PHY-M-VF 1 3.1	Quantum theory of condensed matter II: Mesoscopic physics			Type of exam: Oral or written; duration: 20 min, or 105 min, 135 min or 210 min (if it consists of two parts); time: Lecture period to end of semester	1
14. Notes:					
Further information will be provided by the instructors at the beginning of the course.					

