

Lectures on Hopf algebras

Main speaker: Prof. Yorck Sommerhäuser,

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**First Lecture Series (May 2–May 13):
A Short Introduction to Hopf Algebras**

Abstract: We give an introduction to the theory of Hopf algebras with emphasis on semisimple Hopf algebras. Starting from basic notions, we cover the theory of integrals and its applications to semisimplicity questions and the order of the antipode. Particular emphasis will be put on results that are analogues of results for finite groups, like the theorems of Lagrange and Cauchy. The lecture series will not require background knowledge on Hopf algebras.

**Second Lecture Series (May 16–May 20):
Hopf Algebras and the Modular Group**

Abstract: Over suitable base fields, the character ring of a semisimple factorizable Hopf algebra carries a projective action of the modular group. Depending on the central charge of the Hopf algebra, this representation is even an ordinary linear representation. We show that the kernel of this representation is a congruence subgroup whose level is equal to the exponent of the Hopf algebra. The basic tool in the proof of this result are the equivariant Frobenius-Schur indicators, a generalization of the indicators introduced by F. G. Frobenius and I. Schur that are equivariant with respect to the action of the modular group.

Schedule:

Time	Speaker	Content	Place
May 2, 14:00-15:40	Yorck Sommerhäuser	Algebras and Coalgebras	West Building, 308
May 2, 15:50-16:35	Gongxiang Liu	Basic Notions about quasi-Hopf algebras	West Building, 308
May 3, 14:00-15:40	Yorck Sommerhäuser	Bialgebras and Hopf Algebras	West Building, 308
May 3, 15:50-16:35	Gongxiang Liu	Quasi-Frobenius-Lusztig Kernels I	West Building, 308
May 4, 14:00-15:40	Yorck Sommerhäuser	Hopf Modules	West Building, 308

May 4, 15:50-16:35	Gongxiang Liu	Quasi-Frobenius- Lusztig Kernels II	West Building, 308
May 5, 14:00-15:40	Yorck Sommerhäuser	Integrals	West Building, 308
May 5, 15:50-16:35	Gongxiang Liu	Classification I	West Building, 308
May 6, 14:00-15:40	Yorck Sommerhäuser	Semisimplicity	West Building, 308
May 6, 15:50-16:35	Gongxiang Liu	Classification II	West Building, 308
May 9, 14:00-15:40	Yorck Sommerhäuser	The Nichols-Zoeller Theorem	West Building, 308
May 9, 15:50-16:35	Guohua Liu	TBA	West Building, 308
May 10, 14:00-15:40	Yorck Sommerhäuser	The Class Equation	West Building, 308
May 10, 15:50-16:35	Guohua Liu	TBA	West Building, 308
May 11, 14:00-15:40	Yorck Sommerhäuser	Quasitriangular Hopf Algebras	West Building, 308
May 11, 15:50-16:35	Haixing Zhu	Brauer groups of braided fusion categories I	West Building, 308
May 12, 14:00-15:40	Yorck Sommerhäuser	The Drinfeld Double	West Building, 308
May 12, 15:50-16:35	Haixing Zhu	Brauer groups of braided fusion categories II	West Building, 308
May 13, 14:00-15:40	Yorck Sommerhäuser	Cauchy's Theorem	West Building, 308
May 13, 15:50-16:35	Jincheng Dong	TBA	West Building, 308
May 16, 14:00-15:40	Yorck Sommerhäuser	The Modular Group and its Presentations	West Building, 308
May 16, 15:50-16:35	Jincheng Dong	TBA	West Building, 308
May 17, 14:00-15:40	Yorck Sommerhäuser	The Action of the Modular Group	West Building, 308
May 17,	Shenxiang Wang	Symmetric pairs in	West Building, 308

15:50-16:35		Hom-Yetter-Drinfeld categories	
May 18, 14:00-15:40	Yorck Sommerhäuser	Equivariant Frobenius-Schur Indicators	West Building, 308
May 18, 15:50-16:35	Shenxiang Wang	Hom-Lie algebras in braided monoidal categories	West Building, 308
May 19, 14:00-15:40	Yorck Sommerhäuser	The Congruence Subgroup Property	West Building, 308
May 19, 15:50-16:35	TBA		West Building, 308
May 20, 14:00-15:40	Yorck Sommerhäuser	The Central Charge	West Building, 308
May 20, 15:50-16:35	Zheng Hua	TBA	West Building, 308

You are welcome!