



# Oberseminar

## zur

# Algebra und Algebraischen Kombinatorik

**Dr. Leo Margolis**  
(ICMAT, Madrid)

## An counterexample to the Modular Isomorphism Problem

Say we are given only the ring structure of a group ring  $RG$  of a finite group  $G$  over a commutative ring  $R$ . Can we then find the isomorphism type of  $G$  as a group? This so-called Isomorphism Problem has obvious negative answers, considering e.g. abelian groups over the complex numbers, but more specific formulations have led to many deep results and beautiful mathematics. The last classical open formulation was the so-called Modular Isomorphism Problem: Does the isomorphism type of  $kG$  as a ring determine the isomorphism type of  $G$  as a group, if  $G$  is a  $p$ -group and  $k$  a field of characteristic  $p$ ?

After giving an overview of some history of general isomorphism problems and the state of knowledge on the modular formulation, I will present a recently found counterexample to the Modular Isomorphism Problem and give an idea which techniques were used to find it.

This is joint work with Diego García-Lucas and Ángel del Río.

**Montag, 06.12.2021**  
**ab 14:15 Uhr, Raum a410**

Alle Interessierten sind herzlich eingeladen.

Institut für Algebra, Zahlentheorie  
und Diskrete Mathematik