

11.15 - 12.15 Uhr

Arnaud Beauville (Université Nice Sophia Antipolis)

"Recent developments in the Lüroth problem"

Abstract:

The Lüroth problem asks whether a variety which is unirational (that is, which admits a parametrization by rational functions) is necessarily rational (that is, admits a one-to-one such parametrization). This holds for curves (Lüroth, 1875) and for surfaces (Castelnuovo, 1894); after various attempts, it was shown in 1971 that the answer is quite negative, at least in dimension 3: there are by now many examples of unirational threefolds which are not rational. This leads to look for an intermediate property: a variety X is stably rational if $X \times \mathbf{P}^n$ is rational for $n \gg 0$. Till last year the known examples of unirational, non stably rational varieties were quite particular, but a new idea of Claire Voisin has significantly improved the situation.

14.15 - 15.15 Uhr

Gavril Farkas (Humboldt-Universität zu Berlin)

"K3 surfaces and syzygies of algebraic curves"

Abstract:

Formulated in 1984, Mark Green's Conjecture on syzygies of canonical curves has been one of the most intensely studied questions in the theory of algebraic curves in recent decades. It predicts that the intrinsic geometry of a curve (in the form of linear series) can be recovered in a precise way from the extrinsic geometry of the canonical embedding (in the form of syzygies). In a major breakthrough of the early 2000's, Claire Voisin settled Green's Conjecture for general curves of each genus. I will present an introduction to this circle of ideas and discuss both Voisin's work and recent decisive progress on an intimately related question, namely the Green-Lazarsfeld Secant Conjecture.

15.30 – 16.30 Uhr

Daniel Huybrechts (Rheinische Friedrich-Wilhelms-Universität Bonn)

"On Chow groups of K3 surfaces"

Abstract:

The Chow ring of a projective variety encodes the complete intersection theory of all subvarieties. Neither the image nor the kernel of the cycle class map, which maps the Chow ring to the cohomology ring of the variety, are fully understood. Starting with the work of Beauville and Voisin (2004) it has become clear that Chow groups of K3 surfaces and of their higher-dimensional generalizations enjoy special properties that are not necessarily shared by other types of varieties. For example, the conjectural Bloch-Beilinson filtration of the Chow ring seems to admit a multiplicative splitting. This has been verified for K3 surfaces and many examples in higher dimensions. The structure of the Chow ring is intimately related to the special geometry of this class of varieties, in particular to rational and elliptic curves as well as to Lagrangian subvarieties in higher dimensions.