

**Speaker:** Klaus Hulek

**Title:** Volumes of lattices, the Borcherds modular form and  $K3$  surfaces

**Abstract:** Kondo has proved that the moduli spaces  $\mathcal{F}_{2p^2}$  parametrizing  $K3$ -surfaces with a polarization of degree  $2p^2$  are of general type for  $p$  sufficiently large. Our aim is to improve this result in two directions:

- To give (realistic) effective bounds on the degree,
- To extend this to other polarizations.

In order to achieve this, the following problems have to be solved:

- Compute the dimension of various spaces of modular forms. This requires the computation of the volume of the corresponding lattices.
- Construction of “low weight” modular forms, preferably with given vanishing divisors.
- An analysis of the singularities of the moduli spaces.

In this talk I want to report on recent progress concerning these questions.

This is joint work with V. Gritsenko and G. K. Sankaran.