Algebra and Number Theory Seminar

Title: New 2-arcs in projective Hjelmslev planes

Speaker: Michael Kiermaier (Univ. of Bayreuth)

Date: Mon 19th October 2009 at 4:00PM

Location: Mathematical Sciences Seminar Room

Abstract: There is a close connection between linear codes over a ring R and arcs in the projective geometries over R. The aim is to use the geometric point of view for the construction of good codes.

We look at the case that R is a chain ring of composition length 2. In this case, the geometries are called Hjelmslev geometries. The question for the maximum size of a 2-arc in a projective Hjelmslev plane over R is only answered partially: If R is a Galois ring of even characteristic, there exists an hyperoval. Its Gray image is a nonlinear code with very good parameters.

For non-Galois chain rings R, a new construction of large 2-arcs is given. If the characteristic of R is odd, the size meets the known upper bound, thus solving the maximal 2-arc problem for this instance. Furthermore, the parameters of the Gray image are investigated.