Conference Ball Quotient surfaces and Lattices

Martin Deraux :

A new non-arithmetic lattice in PU(3,1)

It is well known that there are non-arithmetic lattices in the isometry group of complex hyperbolic n-space, at least for small values of the dimension n. For a long time, the only known examples were obtained by a famous construction due do Deligne and Mostow (later reinterpreted by Thurston). I will explain how to check arithmeticity and commensurability relations in another family of lattices, constructed by Couwenberg, Heckman and Looijenga ; this family turns out to produce non-arithmetic lattices (a few in dimension 2 and one in dimension 3) that are new in the sense that they are not commensurable to any Deligne-Mostow example.