

Nicolas Bergeron: Special cycles in ball quotients and moduli spaces of quasi-polarized K3 surfaces

Abstract : In a joint work with J. Millson and C. Moeglin we verify the Hodge conjecture for n -ball quotients in every degree away from the neighborhood $]n/3, 2n/3[$ of the middle degree. More recently with the further help of Z. Li we have proved the Noether-Lefschetz conjecture of Maulik and Pandharipande on moduli spaces of quasi-polarized K3 surfaces. I will review these results and explain how they are related. Both proofs make heavy use of special cycles. Eventually the method is purely automorphic, making use of the recent "endoscopic classification of automorphic representations" by J. Arthur, and can be extended beyond algebraic geometry e.g. to real hyperbolic manifolds.