Some ℓ-adic properties of modular forms with quadratic nebentypus and ℓ-regular partition congruences

Ahmed Mostafa Ismail ELGUINDY (Cairo University, Egypt)

Abstract: In this talk, we discuss a framework for studying ℓ-regular partitions by defining a sequence of modular forms of level ℓ and quadratic character which encode their ℓ-adic behavior. We show that this sequence is congruent modulo increasing powers of ℓ to level 1 modular forms of increasing weights. We then prove that certain modules generated by our sequence are isomorphic to certain subspaces of level 1 cusp forms of weight independent of the power of ℓ, leading to a uniform bound on the ranks of those modules and consequently to ℓ-adic relations between ℓ-regular partition values. This generalizes earlier work of Folsom, Kent and Ono on the partition function, where the relevant forms had no nebentypus, and is joint work with Mostafa Ghazy.