

Slopes of modular forms and the ghost conjecture

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Abstract: Modular forms are holomorphic functions with a wealth of symmetries. Even though these functions are borne out of complex analysis, their Fourier coefficients contain a wealth of arithmetic information. Even bounding the sizes of these coefficients involve very deep mathematics -- the best bounds follow from Deligne's proof of the Weil conjectures, for which he was awarded the Fields medal.

In this talk, rather than looking at complex absolute values, we will instead focus on the p -adic size of p -th Fourier coefficient for a prime number p . We will state a conjecture (the ghost conjecture) which gives an exact description of these sizes for all modular forms. This funnily named conjecture converts difficult automorphic questions into more accessible combinatorial ones.