Mathematics > Number Theory

A characterization of ordinary modular eigenforms with CM

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We show that a p-ordinary modular eigenform f of weight $k\geq 2$, with p-adic Galois representation ρ_f and $\mod{p^m}$ reductions $\rho_{f,m}$, and with complex multiplication(CM) is characterized by the existence of p-ordinary CM companion forms h_m modulo p^m for all integers $m \geq 1$ (in the sense that $\rho_{f,m}\sim \rho_{h_m,m}\otimes\chi^{k-1}$). As an application we give an alternative proof of the well-known result that if f has CM then the restriction of ρ_f to a decomposition group at p splits.

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