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Lifts of Hilbert modular forms and applications to a conjecture of Gross

This talk concerns two approaches to automorphic representations of general spin groups. First, we review a conjecture of Gross which, given an abelian variety over $\mathbb{Q}$ with trivial endomorphism algebra, predicts the weight and level of an automorphic representation of $\mathrm{GSpin}_{2n+1}(\mathbb{A}_{\mathbb{Q}})$ with matching L-function. Second, we review a lifting procedure which produces automorphic representations of $\mathrm{GSpin}_{2n+1}(\mathbb{A}_{\mathbb{Q}})$ from certain Hilbert modular forms over degree n extensions of $\mathbb{Q}$. We then present examples, identified through computational experimentation, of Hilbert modular forms which produce automorphic representations of $\mathrm{GSpin}_{2n+1}(\mathbb{A}_{\mathbb{Q}})$ coming from certain abelian varieties, as predicted by Gross. Joint with Lassina Dembélé.