Recent Developments of the Gross conjecture

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Abstract:

Mumford's families are families of abelian fourfolds parameterized by a Shimura curve, but embedded in A_4 such that they have exceptionally small Mumford-Tate group. We will present recent developments on the Gross conjecture regarding the transversaility between Mumford's families and the Torelli locus. We shall characterize the CM algebra of all the abelian varieties corresponding to CM points on such Shimura curves with respect to Mumford embeddings, and we will use Schottky-Igusa form to provide numerical evidence for the validity of Gross conjecture. We shall also discuss a potential rigorous proof of Gross conjecture by producing specific curves that corresponds to such intersections using theta functions.