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On certain unitary group Shimura varieties

ABSTRACT: We discuss the geometry of a certain class of (PEL) type Shimura varieties, in connection with Langlands conjectures. In particular, we study the Newton polygon stratification and the Oort's foliation of the reduction in positive characteristic of the Shimura varieties. Over some of the leaves of the foliation, we define a tower of finite etale covers, we call Igusa varieties. We construct a system of finite surjective morphisms from the product of the Igusa varieties with the pertinent Rapoport-Zink spaces to each Newton polygon stratum inside the reduction of the Shimura varieties. We also show that the above constructions extend Zariski locally to the corresponding formal schemes in characteristic zero. As a result, we are able to express the cohomology of the Shimura varieties, in terms of the cohomology with compact supports of the Igusa varieties and the Rapoport-Zink spaces.