Complex analytic approach to the study of the image of the Torelli map

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Abstract: The Torelli map is the mapping from a moduli space of curves of genus $g \geq 2$ into a corresponding Siegel modular variety induced by the Abel-Jacobi map. The lift of the mapping to the corresponding universal coverings is a mapping between two bounded domains in complex Euclidean spaces of different dimensions. A conjecture of Oort states that the image of the Torelli map does not contain totally geodesic complex subvarieties with respect to the invariant Bergman metric on the image when g is sufficiently large. The problem is interesting from various complex analytic, geometric, algebraic and arithmetic points of view. We will explain the use of techniques of Several Complex Variables and Complex Geometry in studying aspects of the conjecture.