Newton polygons in the Torelli locus

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The classical Schottky problem asks how to characterize Jacobian varieties of smooth curves among abelian varieties; equivalently, in terms of their moduli spaces, the problem is about describing the Torelli locus in Siegel varieties. In positive characteristic, the first step is to study which Newton polygons occur for Jacobians of smooth curves. As a first example, for all special families of cyclic covers of the projective line considered by Moonen, we proved that every expected Newton polygon occurs via tools from PEL Shimura varieties. Based on these special families, we developed an inductive method to produce infinitely many examples of unlikely intersections of the Torelli locus with certain Newton polygon strata in the Siegel variety.

This is joint work with Wanlin Li, Elena Mantovan, and Rachel Pries.