Finiteness of Teichmueller curves in genus three
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A Teichmueller curve is an algebraic curve in $M_g$ (the moduli space of genus $g$ Riemann surfaces) which is isometrically immersed with respect to the Teichmueller metric. Such a curve is said to be algebraically primitive if the trace field of its uniformizing group has degree $g$.

There are infinitely many examples of algebraically primitive Teichmueller curves in $M_2$, constructed independently by McMullen and Calta, but it has been an open question for a while whether there can be infinitely many such curves in $M_g$ for any larger $g$.

In this talk, I'll discuss the recent theorem that there are only finitely many algebraically primitive Teichmueller curves in $M_3$. This is joint work with Philipp Habeggar and Martin Moeller.