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Small points and free abelian groups

(joint work with P. Habegger and L. Pottmeyer)

Let K be an algebraic extension of the rationals, and let \mathcal{G} represent either an elliptic curve or a multiplicative group. If there are no points of small height in $\mathcal{G}(K)$ (that is, if K has property (B) with respect to the canonical height on \mathcal{G}), then $\mathcal{G}(K)$ is free abelian modulo torsion. We will show that the converse of this statement is false with explicit constructions. This is joint work with Philipp Habegger and Lukas Pottmeyer.