Heegner points on Hijikata–Pizer–Schemanske curves

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Let $E/\mathbb{Q}$ be an elliptic curve and K be an imaginary quadratic field. If the sign of the functional equation for the L-series $L(E/K, s)$ is -1, one expects to construct algebraic points on E from CM points on suitable modular or Shimura curves. Under appropriate *Heegner hypotheses* on $(\mathrm{cond}(E), \mathrm{disc}(K))$ such constructions are nowadays well-known, and they give rise to non-torsion points precisely when $L'(E/K, 1) \neq 0$. However, many arithmetically interesting situations are not covered by the usual Heegner hypotheses. In a joint work with M. Longo and V. Rotger, we propose a new Heegner point construction which requires (essentially) no Heegner hypothesis. To do so, we explore CM points on Shimura curves attached to rather general quaternionic orders, closely related to those investigated by Hijikata–Pizer–Schemanske in the 80's. As an application of our construction, we can address new instances of the BSD conjecture.