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Conjectures for moments of cubic twists of elliptic curves

We will discuss an extension of the heuristic introduced by Conrey, Farmer, Keating, Rubinstein, and Snaith (commonly known as "the recipe") that yields conjectures for the (k, ℓ) -moments of L -functions of elliptic curves twisted by cubic characters. By applying the work of Keating and Snaith on the (k, ℓ) -moments of characteristic polynomials of unitary matrices, the conjectures can be extended to $k, \ell \in \mathbb{C}$ such that $\operatorname{Re}(k), \operatorname{Re}(\ell)$, and $\operatorname{Re}(k + \ell) > -1$. We will also present numerical testing supporting the conjectures. This is joint work with C. David and J. B. Nam.