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Rebecca R.G.* (rirg@umich.edu). *Closures That Give Big Cohen-Macaulay Modules and Algebras, and Smallest Closures*. Preliminary report.

Geoffrey Dietz has introduced a set of axioms for a closure operation on a complete local domain R so that if such a closure operation exists, the ring is guaranteed to have a balanced big Cohen-Macaulay module. These are called Dietz closures. In characteristic $p > 0$, solid closure, tight closure, and plus closure all satisfy the axioms. I will discuss a new axiom that, together with the Dietz axioms, is equivalent to the existence of a big Cohen-Macaulay algebra. This new axiom holds for large classes of closures, including those listed above. Further, any Dietz closure is trivial on regular rings. I will also discuss the existence of smallest closure operations satisfying certain sets of axioms, including the Dietz axioms. There are many open questions about the nature of various smallest closures. (Received January 19, 2015)