1114-13-219   **Rebecca R.G.*** (`rirg@umich.edu`). *Closure operations that give big Cohen-Macaulay modules and algebras.* Preliminary report.

Geoffrey Dietz introduced a set of axioms for a closure operation on a complete local domain R such that the existence of a closure operation satisfying the axioms is equivalent to the existence of a big Cohen-Macaulay module. These are called Dietz closures. In characteristic $p > 0$, solid closure, tight closure, and plus closure all satisfy the axioms. Some closures based on properties of local cohomology have been proposed as possible Dietz closures in mixed characteristic.

I will show that under mild conditions, a ring R is regular if and only if all Dietz closures on R are trivial. In particular, if R is not regular, a module of syzygies gives a nontrivial Dietz closure. I will also discuss a new axiom for a closure operation such that the existence of a Dietz closure satisfying this additional axiom is equivalent to the existence of a big Cohen-Macaulay algebra. (Received August 28, 2015)