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Neil Epstein, Rebecca R.G. and **Janet Vassilev*** (jvassil@math.unm.edu). *Duality of closures and interiors defined via colons*. Preliminary report.

Let (R, \mathfrak{m}) be a local Noetherian ring. For an \mathfrak{m} -primary submodule, L of an R -module M , Heinzer, Ratliff and Rush defined the basically full closure of L in M to be $L_M^{\text{mbf}} = (\mathfrak{m}L :_M \mathfrak{m})$. In fact, for any ideal J and any finitely generated modules $L \subseteq M$, $L_M^{J\text{bf}} = (JL :_M J)$ is a closure operation which we call the J -basically full closure.

Building on the duality for submodule selectors developed by Epstein and R.G., we develop a duality between pairs of modules $L \subseteq M$, which we use to produce a dual interior operation for and the J -basically full closure on a pair of Artinian R -modules $A \subseteq B$ called J -basically empty interior which also has a nice formula in terms of colons.

Through our duality, we are also able to develop criteria for when a submodule of $E_R(R/\mathfrak{m})$, the injective hull of the residue field, is integrally open and formulas to compute the integral-hull of some submodules of $E_R(R/\mathfrak{m})$. This is joint work with Neil Epstein and Rebecca R.G. (Received March 05, 2021)