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Neil E Steinburg* (neil.steinburg@drake.edu). *How to tell the torsion a tensor takes.*

While tensor products are quite prolific in commutative algebra, even some of their most basic properties remain relatively unknown. We explore one of these properties, namely a tensor's torsion. Given any finitely generated modules, M and N over a ring R , the tensor product $M \otimes_R N$ almost always has nonzero torsion unless one of the modules M or N is free. We seek to determine which rings guarantee nonzero torsion in a tensor product of non-free modules over the ring. In particular, if R is a Gorenstein one-dimensional domain, let E be the endomorphism ring of the maximal ideal of R , viewed as a subring of the integral closure, \overline{R} . If $M \otimes_R N$ is torsion-free with neither M nor N free, we show that E must be local with the same residue field as R . This is joint work with Roger Wiegand. (Received September 17, 2019)