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Uli Walther* (walther@math.purdue.edu) and **Mathias Schulze**. *Cohen–Macaulayness and computation of Newton graded toric rings.*

Let $H \subseteq ZZ^d$ be a positive semigroup generated by $A \subseteq H$, and let $KK[H]$ be the associated semigroup ring over a field KK . We investigate heredity of the Cohen–Macaulay property from $KK[H]$ to both its A -Newton graded ring and to its face rings. We show by example that neither one inherits in general the Cohen–Macaulay property. On the positive side we show that for every H there exist generating sets A for which the Newton graduation preserves Cohen–Macaulayness. This gives an elementary proof for an important vanishing result on A -hypergeometric Euler–Koszul homology. As a tool for our investigations we discuss an algorithm to compute algorithmically the Newton filtration on a toric ring. (Received January 30, 2009)