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Cohen-Macaulay multigraded modules.

Let S be a standard N^r -graded algebra over a local ring A , and let M be a finitely generated Z^r -graded module over S . We characterize the Cohen-Macaulayness of M in terms of the vanishing of certain sheaf cohomology modules. Our work extends previous studies on the Cohen-Macaulayness of multi-Rees algebras. (Received January 23, 2008)