1075-13-167 **Yi Zhang*** (zhang397@umn.edu), School of Mathematics, University of Minnesota, Minneapolis, MN 55455. *Graded F-modules and Local Cohomology.*

Let $R = k[x_1, \cdots, x_n]$ be a polynomial ring over a field k of characteristic $p > 0$, let $\mathfrak{m} = (x_1, \cdots, x_n)$ be the maximal ideal generated by the variables, let ${}^*E$ be the naturally graded injective hull of $R/\mathfrak{m}$ and let ${}^*E(n)$ be ${}^*E$ degree shifted downward by n. We introduce the notion of graded F-modules (as a refinement of the notion of F-modules) and show that if a graded F-module $\mathfrak{M}$ has zero-dimensional support, then $\mathfrak{M}$, as a graded R-module, is isomorphic to a direct sum of a (possibly infinite) number of copies of ${}^*E(n)$.

As a consequence, we show that if I is a homogeneous ideal of R, then as a naturally graded R-module, the local cohomology module $H^i_{\mathfrak{m}}(H^j_I(R))$ is isomorphic to ${}^*E(n)^c$, where c is a finite number. If char$k = 0$, this question is open. (Received August 29, 2011)