1067-13-390   **Emily E Witt*** (`emwitt@umich.edu`), Department of Mathematics, 530 Church St, Ann Arbor, MI 48109. *Local cohomology modules as G-modules.*

Suppose that R is a polynomial over a field k of characteristic zero, and that G is a linearly reductive group acting "very nicely" on R. We make use of this action, and apply Lyubeznik's results on D-modules, to study the structure of local cohomology modules $H_I^i(R)$, where I is a certain G-stable ideal. One notable application of this result is the case when R is the polynomial ring $k[X]$, where $X = [x_{ij}]$ is an $r \times s$ $(r \leq s)$ matrix of indeterminates, and I is the ideal generated by the $r \times r$ minors (the maximal minors) of X. In this case, we find $H_I^N(R)$ for $N = \max_i \{H_I^i(R) \neq 0\}$, completely determine the indices i for which $H_I^i(R) \neq 0$, and also describe the nonzero $H_I^i(R)$ as submodules of certain indecomposable injective modules. (Received September 22, 2010)