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Let  $\mathfrak{g}$  be a simple classical Lie superalgebra as classified by Kac. In this talk, we will construct "elementary abelian" subalgebras of  $\mathfrak{g}$  using invariant theory of finite groups which "detect" the relative cohomology of  $\mathfrak{g}$  with respect to  $\mathfrak{g}_0$ . This will enable us to define rank varieties and develop a theory of support varieties for modules over the Lie superalgebra. Later it will be shown how this allows us to extend the combinatorial description of "atypicality" (due to Kac and Serganova) of simple  $\mathfrak{gl}(m|n)$ -modules to all  $\mathfrak{gl}(m|n)$ -modules in a functorial way. (Received February 24, 2006)