Axiomatizing previous results in the setting of commutative Noetherian rings and the modular representations of finite groups, Balmer introduced the notion of the spectrum of a tensor triangulated category. It is analogous to the spectrum of a ring but in this case the tensor product and direct sum play the role of multiplication and addition. It is an open question to compute the Balmer spectrum for interesting categories. We successfully answer this question for the finite dimensional representations of the Lie superalgebra $\mathfrak{gl}(m,n)$ using support varieties of the detecting subalgebra of $\mathfrak{gl}(m,n)$. (Received July 09, 2014)