1003-55-551 **James R. Gillespie*** (`jrg21@psu.edu`), 4000 University Drive, Frable Building, Penn State University, McKeesport, PA 15132. *Homological algebra in Grothendieck categories.* Preliminary report.

In a Grothendieck category with a tensor product, we get the notion of a flat object. These are the tensor exact objects. Recent advances have shown that in many typical cases, such as categories of modules or (quasi-coherent) sheaves, every object has a flat cover. The speaker will explain how in any Grothendieck category which satisfies a few properties similar to the above categories we can define a monoidal model structure (in the sense of Quillen) on the associated chain complex category. Rather than focusing on projective or injective objects, the emphasis in this model structure is on the flat and cotorsion objects. In short, we have a flat/cotorsion version of homological algebra. I.e., we can define the functors Ext and Tor using flat resolutions and cotorsion coresolutions rather than using projective resolutions or injective coresolutions. The main applications are to the above mentioned sheaf categories in which we don't have enough projective objects and the injective objects don't interact well with the tensor product. (Received September 21, 2004)