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Exceptional collections on arithmetic toric varieties

An "arithmetic toric variety" is a normal variety with a faithful action of an algebraic torus having a dense open orbit. When the base field is algebraically closed, there is only one torus in every dimension and one can identify the torus with its orbit. Over a general field, there may be many non-isomorphic tori of the same dimension. Moreover, it is no longer possible to identify the torus with its orbit since there may not exist any rational points.

Exceptional collections are one way of describing the bounded derived categories of coherent sheaves on a variety. The existence of exceptional collection is a very strong condition but, nevertheless, Kawamata showed that all smooth projective toric varieties possess exceptional collections when the ground field is algebraically closed. For a general field, this immediately fails even in dimension 1. However, if one allows an arithmetic generalization of the "usual" notion of exceptional object, then the theory is again interesting.