SEMINARIO DI GEOMETRIA

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Spherelike divisors

Let X be a smooth projective variety of dimension d. An object S in $\mathcal{D}^b(X)$ is called *spherical* if

(1) $Ext^\bullet(S, S) = \Bbbk \oplus \Bbbk[-d];$ *d-spherelike object*
(2) $S \otimes \omega_X \cong S.$ *Calabi-Yau object*

In [ST], P. Seidel and R. Thomas show that such an S defines an autoequivalence T_S, the *spherical twist* about S. In the context of the homological mirror symmetry conjecture, they showed that T_S is dual to the Dehn twist of a symplectic manifold about a Lagrangian.

In general, the Calabi-Yau property of a spherical object will be lost under birational transformations of X. In [HKP], M. Kalck, D. Ploog and I showed how to associate to an arbitrary spherelike object F in a triangulated category $\mathcal{D}$ a unique maximal triangulated subcategory $\mathcal{D}_F$, where F becomes spherical – the *spherical subcategory* of F.

In this talk, I will give a short introduction to spherical subcategories and then will focus on the case of *spherelike divisors* D on a surface X, i.e. effective divisors such that $\mathcal{O}_D$ is spherelike. Especially, I will talk about a numerical characterisation of these divisors and to what extend they can be classified.

This is work in progress with D. Ploog.

REFERENCES

[HKP] A. Hochenegger, M. Kalck und D. Ploog: *Spherical Subcategories in Algebraic Geometry.* Math. Nachr. doi: 10.1002/mana.201400232 (2016), also arXiv:1208.4046.
[HP] A. Hochenegger and D. Ploog: *Spherelike and rigid divisors.* In preparation.
[ST] P. Seidel, R. Thomas, *Braid group actions on derived categories of coherent sheaves.* Duke Math. J. **108** (2001), 37–108, also arXiv:math:/0001043.