

# Spherical Objects and Simple Curves

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A theorem by Burban and Drozd (2011) states that the category  $\text{Perf } E_n$  of perfect complexes over a cycle of projective lines  $E_n$  ( $n \in \mathbb{N}$ ) can be modeled by a subcategory of  $\mathcal{D}^b(\Gamma_n)$ , the bounded derived category of finitely generated modules over a certain gentle algebra  $\Gamma_n$ . In particular, questions about spherical objects in  $\text{Perf } E_n$  and their associated spherical twists can be studied by means of the gentle algebra. Inspired by the Homological Mirror Symmetry Conjecture, I will establish a connection between homotopy bands of  $\Gamma_n$  in the sense of Bekkert and Merklen (2003) and certain curves on the torus with  $n$  punctures. I will explain how the combinatorics of morphisms, mapping cones and spherical twists in  $\mathcal{D}^b(\Gamma)$  are connected to intersection points, surgeries and Dehn twists by simple curves. Finally, I will talk about applications to spherical objects in  $\text{Perf } E_n$ .