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Calabi-Yau geometries: Rigid threefolds and Hodge structures

I will discuss some geometric properties of the rigid Calabi-Yau threefold $\mathcal{Z}$ introduced by Beauville. First, we describe the cohomology of $\mathcal{Z}$ and give a simple formula for the trilinear intersection form on $Pic(\mathcal{Z})$. By contracting some curves on $\mathcal{Z}$ and smoothing the resulting variety, we obtain other non rigid Calabi-Yau threefolds (joint work with A. Garbagnati). In the second part of the talk I will discuss a specific Hodge structure of Calabi-Yau type of weight 3 (joint work with S.L. Cacciatori) and explain how it possibly relates to a generalized mirror of $\mathcal{Z}$.