Semi-purity for cycles with modulus

Abstract: In this talk, we will discuss a certain purity property for the $(\mathbb{P}^1, \infty)$-invariant replacement of the Yoneda object $\mathbb{Z}(\mathscr{X})$ of a modulus pair $\mathscr{X}$ consisting of a smooth projective variety over a field k and an effective Cartier divisor on it (an analogue of the Suslin-Voevodsky $h_0(X)$ construction in the $\mathbb{A}^1$-invariant setting). This implies, thanks to a result of S. Saito, the analogue in the modulus setting of Voevodsky's fundamental theorem on the homotopy invariance of the cohomology of $\mathbb{A}^1$-invariant sheaves with transfers. This plays an essential role in the development of the theory of motives with modulus, and among other things implies the existence of a homotopy t-structure on the category $\mathbf{MDM}^{\mathrm{eff}}(k)$ of (effective) motives with modulus in the sense of Kahn-Saito-Yamazaki. This is a joint work with Shuji Saito.