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On Grothendieck bifibrations arising from classes of monomorphisms

Let $\mathcal{M}$ be a class of monomorphisms in a category $\mathbb{C}$ such that $\mathbb{C}$ has right $\mathcal{M}$-factorisations. The corresponding $\mathcal{M}$-*subobject functor* $\mathbb{C} \to \mathbf{Cat}$ gives rise, via the Grothendieck construction, to a Grothendieck opfibration over $\mathbb{C}$. It is well known that this opfibration is a bifibration if and only if every morphism m from $\mathcal{M}$ has a pullback along an arbitrary morphism and moreover, such pullback is still in the class $\mathcal{M}$. In this talk, which is based on a joint work in progress with Zurab Janelidze, we will characterize Grothendieck bifibrations arising in this way, as well as those that arise from a class $\mathcal{M}$ (of monomorphisms) which is part of a factorisation system on $\mathbb{C}$. We will then look at some further conditions on Grothendieck bifibrations satisfied by several concrete Grothendieck bifibrations, and in particular, those arising from various classes of monomorphisms in the categories of group-like structures.