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## New fully nonlinear dynamical mechanism for formation of scalarized black holes

We will discuss the existence of a new fully nonlinear dynamical mechanism for the formation of scalarized black holes which is different from the spontaneous scalarization. We consider a class of scalar-Gauss-Bonnet gravity theories within which no tachyonic instability can occur. Although the Schwarzschild black holes are linearly stable against scalar perturbations, we show dynamically that for certain choices of the coupling function they are unstable against nonlinear scalar perturbations. This nonlinear instability leads to the formation of new black holes with scalar hair.

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