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A. Bokulic: Can nonlinear electromagnetic fields regularize black hole singularities?

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Before considering any modifications of classical gravitational theory, the question is whether black hole singularities can be cured by coupling to some type of matter fields. We inspect nonlinear electromagnetic theories as candidates for resolving black hole singularities. This problem was first systematically addressed by Bronnikov, whose no-go theorems are focused on spherically symmetric space- times sourced by nonlinear electromagnetic Lagrangians depending on one electromagnetic invariant, FabFab. We extend Bronnikov's analysis to a broader class of Lagrangians, those depending on both electromagnetic invariants, $F_{ab} F^{ab}$ and $F_{ab}*F^{ab}$. The obtained results significantly narrow down the possibility of regularization using physically plausible Lagrangians.

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