
Charging Kerr-Schild spacetimes in higher dimensions

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Abstract

We study higher dimensional charged Kerr-Schild (KS) spacetimes that can be constructed by a KS transformation of a vacuum solution with an arbitrary cosmological constant. Focusing on the expanding case, we first characterize the presence of shear as an obstruction to non-null fields. We next obtain the complete family of shearfree solutions. In the twistfree case, they coincide with charged Schwarzschild-Tangherlini-like black holes. Twisting solutions consist of a four-parameter family of higher dimensional charged Taub-NUT metrics with a base space of constant holomorphic sectional curvature. Finally, it is shown that null fields define a branch of twistfree but shearing solutions, exemplified by the product of a Vaidya-like radiating spacetime with an extra dimension.

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