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Multipole Hair of Schwarzschild-Tangherlini Black Holes MATTHEW FOX, Harvey Mudd College — We study the field of an electric point charge that is slowly lowered into an $n+1$ dimensional Schwarzschild-Tangherlini black hole. We find that if $n > 3$, then countably infinite multipole moments manifest to observers outside the event horizon as the charge falls in. This suggests the final state of the black hole is not characterized by a Reissner-Nordström-Tangherlini geometry. Instead, for odd n, the final state either possesses a degenerate horizon, undergoes a discontinuous topological transformation during the infall of the charge, or both. For even n, the final state is not guaranteed to be asymptotically-flat.

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