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# Research Highlight: Curvature Blow-up and Mass Inflation in Spherically Symmetric Collapse to a Schwarzschild Black Hole

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The authors study the black hole interiors of spacetimes arising from gravitational collapse within the spherically symmetric Einstein-scalar field system. By investigating the precise blow-up rates of curvature and mass at the spacelike singularity, near timelike infinity, the authors give an answer to whether the interior metric converges to a Schwarzschild metric. It is shown that the Kretschmann scalar blows up faster than in the Schwarzschild setting, due to mass inflation. Moreover, the blow-up rate is not constant and converges to the Schwarzschild rate towards timelike infinity and it depends on the precise late-time polynomial behaviour of the scalar field along the event horizon. It indicates a new blow-up phenomenon, driven by a PDE mechanism, rather than an ODE mechanism. This result is based on a recent work of the first author and Zhang, where they prove the polynomial blow-up upper bounds for the Einstein-scalar field system under spherical symmetry.

**References:**

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