

Exact solutions for black holes with a smooth quantum core

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A class of exact solutions are presented for the interior of black holes of solar mass and beyond. In a core enclosed by the inner horizon, the binding energy released by dissolution of the pre-collapse nuclei is stored in electrostatic and zero point energy. Gravitational collapse is prevented by their negative pressures.

Accounting for the rest masses of the up and down quarks and electrons leads to corrections at the per cent level.

A surface layer with additional mass and charge can be present on the outer side of the inner and event horizons, so that neutral black holes can be extremal in the interior.

Merging of extremal black holes may produce fireworks.

[1] [arXiv:2108.01422](https://arxiv.org/abs/2108.01422) The interior of hairy black holes in standard model physics