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Black holes with electroweak hair

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We construct static and axially symmetric magnetically charged hairy black holes in the gravity-coupled Weinberg-Salam theory. Large black holes merge with the Reissner-Nordström (RN) family, while the small ones are extremal and support a hair in the form of a ring-shaped electroweak condensate carrying superconducting W-currents and up to 22% of the total magnetic charge. The extremal solutions are asymptotically RN

with a mass {it below} the total charge, $M < |Q|$, due to the negative Zeeman energy of the condensate interacting with the black hole magnetic field. Therefore, they cannot decay into RN black holes. As their charge increases, they show a phase transition when the horizon symmetry changes from spherical to oblate. At this point they have the mass typical for planetary size black holes of which $\approx 11\%$ are stored in the hair. Being obtained within a well-tested theory, our solutions are expected to be physically relevant.

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