

Black Hole Chemistry

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Abstract

The mass of a black hole has traditionally been identified with its energy. We describe a new perspective on black hole thermodynamics, one that identifies the mass of a black hole with chemical enthalpy, and the cosmological constant as thermodynamic pressure. This leads to an understanding of black holes from the viewpoint of chemistry, in terms of concepts such as Van der Waals fluids, reentrant phase transitions, and triple points. Both charged and rotating black holes exhibit novel chemical-type phase behaviour, hitherto unseen.

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