

Mathematical properties of quasiblack holes and compact objects

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A compact object is a self-gravitating matter system characterized by having a radius not much larger than its own gravitational radius. A neutron star is an instance of a compact object since its radius is about twice its own gravitational radius. Quasiblack holes are compact objects par excellence, they are self-gravitating matter systems on the verge of becoming black holes. Here, emphasis is given on quasiblack hole properties rather than on quasiblack hole solutions. In particular their entropy is derived from a sequence of quasistatic self-gravitating matter systems up to the quasiblack hole state. In the non-extremal case the Bekenstein-Hawking entropy is obtained. In the extremal case the entropy can have values between zero and the Bekenstein-Hawking entropy depending on the way the quasiblack hole has been generated, a result that sheds light on the entropy of extremal black holes. As black hole mimickers, quasiblack holes are candidates in the search through gravitational waves for new objects.