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BH and (neutron) stars in the minimal theory of massive gravity

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The minimal theory of massive gravity (MTMG) is a theory of massive gravity that displays only the two canonical tensor degrees of freedom.Thus it provides a natural explanation for the late-time acceleration (via the graviton's mass) while passing with flying colors the bounds of GW170817 + GRB170817A, as the speed of GW is exactly 1. As this theory was constructed for cosmological purposes, it is natural to ask whether if it is also viable at astrophysical scales, and notably if its gravitational radiations match the observed ones. The first step in this direction is to investigate if black holes (BH) and neutron stars exist in such a theory.

After a rapid review of the peculiar properties of MTMG, we will show that neutron stars and static BH are natural solutions. This is the first construction of BH in a theory of massive gravity that agree with the corresponding solutions in GR and that are free from strong coupling issues. This result implies notably that the post-Newtonian parameters β and γ are 1. We will finally discuss the existence of realistic, spinning BH.

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