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The sharpness of the quark-hadron transition and the properties of hybrid stars

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In this work we propose a new type of hybrid star and study its properties. The quark phase is described by the MIT bag model with repulsive vector interactions and the hadron phase is described by the HLPS model, which is consistent with chiral effective field theory. In the junction of the two phases there can be a discontinuity (a "jump") in the energy density, which is related to the latent heat of the strongly interacting matter. We use a prescription to match the two phases, in which we can control the sharpness of the transition. We study how changes in the sharpness affect the mass, radius, tidal deformability and the speed of sound in the star.

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