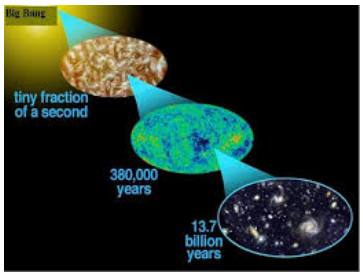

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GW190814 secondary component as Neutron star with Hadron-Quark phase transition.

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GW190814 secondary component as Neutron star with
Hadron-Quark phase transition.
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The recently observed gravitational wave event GW190814 has a secondary component with a mass in the range 2.50-2.67M , which lies in the mass gap region raising the question as whether it is a supermassive neutron stars or a light black hole. In this context, I study the properties of the Neutron star(NS) with Hadrons along with a Phase transition to Quark matter. The NS properties are calculated using the density-dependent relativistic mean-field model (DD-RMF) for the hadronic matter . The Quark matter is studied by employing the Vector-Enhanced Bag model (vBag). The phase transition properties of the mixed Equation of State (EoS) are studied using both Maxwell and Gibbs mechanisms. The maximum mass of neutron star with the used DD-RMF parameter sets is found to be around 2.55M for pure hadronic phase and around 2M for hadron-quark mixed phase using both Gibbs and Maxwell construction. The tidal deformability for the hybrid EoS at 1.4M , Λ 1.4 , remains unchanged from the pure hadronic EoS with Maxwell construction, but decreases with the increasing neutron star mass for Gibbs construction. Thus while the pure hadron matter EoS satisfies the mass constraint from recently observed GW190814 data, the star matter properties for the hadron-quark phase transition satisfy the constraints from the recent observations GW170817. Therefore, we cannot exclude the possibility of the secondary object in GW190814 as a neutron star composed of hadrons and quarks.

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