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Neutron Star Masses and GW190425 MARC PENULIAR[1], JOCELYN READ[2], California State University, Fullerton — In 2019, the gravitational wave observatories of LIGO and Virgo discovered a second neutron star binary, GW190425, with a high total mass of about 3.4 solar masses (M⊙). Notably, the mass of its heaviest component is estimated to lie between 1.61 M⊙ and 2.52 M⊙. This makes GW190425 unusual compared to galactic double neutron star binaries. While mass measurements of all galactic neutron stars show a range of values between roughly 1 and 2.5 times the mass of the sun, those in double neutron star binaries have components around 1.4 M⊙, and LIGOs first neutron star merger observation, GW170817, was compatible with two components around 1.4 M⊙. Here, we compare the range of masses compatible with GW190425 to a neutron star binary population generated using the full galactic mass distribution. We use the double Gaussian distribution fit by Alsing et al 2018 for the galactic masses. Our comparison suggests that, if the new binary came from a population with masses as seen in our galaxy, GW190425 had a larger mass ratio than suggested by gravitational-wave data alone, with one component near the typical 1.4 M⊙ value and the other similar to the most massive neutron stars observed in our galaxy.

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