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# Heavy Stars from Light Scalars

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e size and shape of stellar remnants are surprisingly sensitive to new light particles. We find large effects on the mass and radius of these astrophysical objects. In particular, we study light scalar fields coupled to SM ma er in spherically symmetric compact objects. Focusing on one baryon (the neutron) we show that a sourced scalar eld can induce a phase transition in nuclear ma er, leading to strong modi cations of the stellar structure. e scalar eld can induce a new ground state of nuclear ma er, similarly to strange quark matter. Significantly smaller than stars, so called nuggets can also exist, which are not held together by gravity but due to the force induced by the new ground state. e mass and radius of neutron stars can be very different, in particular the formation of neutron stars with maximal masses above 2 solar masses is easily possible. is new mechanism to stiffen the equation of state can balance the generic softening expected in high density nuclear matter, which seems to be in tension with the most massive neutron stars observed.

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