Abstract Submitted
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New methods for the equation of state of neutron stars CORBINIAN WELLENHOFER, Technische Universitat Darmstadt — The equation of state (EOS) of hot and dense matter is crucial for our understanding of neutron stars, neutron-star mergers, and core-collapse supernovae. In recent years, effective field theory methods have enabled systematic calculations of the low-density EOS with controlled uncertainties. Further, new constraints for the high-density EOS have been extracted from neutron-star observations and QCD computations. These advances make it possible to approach the construction of astrophysical equations of state as a constrained extrapolation problem (CEP). In this talk, we develop a new method for the CEP. We apply the method to the universal dilute Fermi gas with strong interactions and find that it yields accurate approximations that agree with exact results [1,2]. We then set up a CEP-type construction for the EOS for astrophysical applications, and develop new equations of state that are consistent with nuclear physics, observations and high-density QCD calculations [3]. [1] C. Wellenhofer, C. Drischler, A. Schwenk, Phys.Lett.B 802 (2020) [2] C. Wellenhofer, D.R. Phillips, A. Schwenk, arXiv:2006.01429 [3] S. Huth, C. Wellenhofer, A. Schwenk, in preparation

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