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Nuclear thermodynamics from chiral low-momentum interactions[1] JEREMY HOLT, University of Washington, CORBINIAN WELLENHOFER, NORBERT KAISER, WOLFRAM WEISE, Technical University of Munich — The thermodynamical equation of state of asymmetric nuclear matter is an important input for simulations of core-collapse supernovae. In the present work we take advantage of recent improvements in nuclear force models based on chiral effective field theory to construct an equation of state of nuclear matter at finite temperature. Nuclear two-body forces fit to elastic nucleon-nucleon scattering phase shifts and three-body forces fit to the binding energy and lifetime of the triton form the microscopic basis for our perturbative calculations. Bulk properties of symmetric nuclear matter at zero temperature are used to benchmark our many-body methods and nuclear force models, and uncertainty estimates on the equation of state are obtained by varying the resolution scale at which nuclear dynamics are resolved.

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