DD2Y

EoS Submission Details

EoS name	DD2Y
category	hadronic
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Abstract

This is the hadronic EOS table of Ref. [1], which is based on the statistical model of Hempel and Schaffner-Bielich [2] with DD2 interactions [3]. The original model [2,3] has been extended to include the entire baryon octet [1].

References to the original work

1. M. Marques, M. Oertel, M. Hempel, J. Novak, Phys.Rev. C96, 045806 (2017).
2. M. Hempel and J. Schaffner-Bielich, Nucl. Phys. A 837 (2010) 210.
3. S. Typel, G. Röpke, T. Klähn, D. Blaschke, and H.H. Wolter, Phys. Rev. C 81 (2010) 015803.

Nuclear Matter Properties[1]

	Quantity	Unit	
n_S	saturation density in symmetric matter	fm^{-3}	0.1491
E_0	binding energy per baryon at saturation	MeV	16.02
K	incompressibility	MeV	242.7
K'	skewness	MeV	168.7
J	symmetry energy	MeV	31.67
L	symmetry energy slope parameter	MeV	55.03
K_{sym}	symmetry incompressibility	MeV	-93.2

Neutron Star Properties[1]

	Quantity	Unit	
M_{max}	maximum mass	M_{sun}	2.03
$M_{DU,e}$	mass at DUrca threshold (1/9) w/o μ^-	M_{sun}	-
$R_{M_{max}}$	radius at maximum NS mass	km	11.4
$R_{1.4}$	radius at 1.4 M_{sun} NS mass	km	13.2

eos.thermo

eos.thermo and the three grid defining files are CompOSE standard data files and by definition available. eos.thermo does not necessarily provide all possible data.

table dimension	3
table type	1
total number of grid points	1472580

Range and density (#) of the grid parameters:

	Quantity	Unit	min	max	#
T	Temperature	MeV	0.1E+00	0.15848932E+03	81
n_b	Baryon Nr Density	fm^{-3}	0.1E-11	1.2	303
Y_q	Charge Fraction		0.10000000E-01	0.60000000E+00	60

T, n_b, and Y_q are stored in eos.t, eos.nb, and eos.yq, respectively.

[1] 0-values indicate, that the corresponding data is not provided.

Further Available Data Files

Files and quantities listed in the following are provided beyond CompOSE's core requirements as outlined in Sec.4.2. of the CompOSE manual.

eos.compo : available

index	particle
0	e^-
10	n
11	p
100	Λ
110	Σ^-
111	Σ^0
112	Σ^+
120	Ξ^-
121	Ξ^0
4002	$^2_4$He
3002	$^2_3$He
3001	$^1_3$H
2001	$^1_2$H
	- end of table -

The listed particle number fractions are net fractions, i.e., they are given by the difference between the correspoding particle and anti-particle fractions. Further particle sets are defined.

index	description
999	Average fraction, mass and proton number for all nuclei not listed above
	- end of table -

eos.micro : available

index	quantity	particle
10041	Dirac effective mass divided by particle mass m_i^D/m_i	n
11041	Dirac effective mass divided by particle mass m_i^D/m_i	p
100041	Dirac effective mass divided by particle mass m_i^D/m_i	Λ
110041	Dirac effective mass divided by particle mass m_i^D/m_i	Σ^-
111041	Dirac effective mass divided by particle mass m_i^D/m_i	Σ^0
112041	Dirac effective mass divided by particle mass m_i^D/m_i	Σ^+
120041	Dirac effective mass divided by particle mass m_i^D/m_i	Ξ^-
121041	Dirac effective mass divided by particle mass m_i^D/m_i	Ξ^0
10051	relativistic vector self-energy V_i	n
11051	relativistic vector self-energy V_i	p
	- continued on next page -	

index	quantity	particle
100051	relativistic vector self-energy V_i	Λ
110051	relativistic vector self-energy V_i	Σ^-
111051	relativistic vector self-energy V_i	Σ^0
112051	relativistic vector self-energy V_i	Σ^+
120051	relativistic vector self-energy V_i	Ξ^-
121051	relativistic vector self-energy V_i	Ξ^0
	- end of table -	