DDHδ Y4

EoS Submission Details

EoS name	DDHδ Y4
category	hadronic
submitted by	Micaela Oertel
affiliation	LUTH,CNRS/Observatoire de Paris/Université Paris 7
e-mail contact	micaela.oertel@obspm.fr
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Abstract

This EoS is based on the RMF parameterisation DDHδ [1] for cold neutron star matter in β-equilibrium containing the baryon octet and electrons, see Ref. [2] for details of the parameterisation of hyperonic interactions. For the crust, the EoS by Douchin and Haensel [3] has been added below a density of $n_B = 2.5 \times 10^{-4}\mathrm{fm}^{-3}$ and the inner crust has been computed following [4]. Proton fraction and compositional information is available for the core only.

References to the original work

1. T. Gaitanos *et al*, Nucl. Phys. **A732**, 24 (2004).
2. M. Oertel, C. Providência, F. Gulminelli, A. Raduta, arxiv:1412.4545.
3. F. Douchin, P. Haensel, Astronomy and Astrophysics **380**, 151 (2001).
4. F. Grill, H. Pais, C. Providência, I. Vidaña and S. S. Avancini, Phys. Rev. C **90**, 045803 (2014).

Nuclear Matter Properties[1]

	Quantity	Unit	
n_S	saturation density in symmetric matter	fm^{-3}	0.153
E_0	binding energy per baryon at saturation	MeV	16.3
K	incompressibility	MeV	240
K'	skewness	MeV	0.0
J	symmetry energy	MeV	25.1
L	symmetry energy slope parameter	MeV	44
K_{sym}	symmetry incompressibility	MeV	0.0

Neutron Star Properties[1]

	Quantity	Unit	
M_{max}	maximum mass	$\mathrm{M_{sun}}$	2.05
$M_{DU,e}$	mass at DUrca threshold (1/9) w/o μ^-	$\mathrm{M_{sun}}$	-
$R_{M_{max}}$	radius at maximum NS mass	km	11.26
$R_{1.4}$	radius at 1.4 $\mathrm{M_{sun}}$ NS mass	km	12.58

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

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	1
table type	1
total number of grid points	305

Range and density (#) of the grid parameters:

	Quantity	Unit	min	max	#
T	Temperature	MeV	0.0	0.0	1
n_b	Baryon Nr Density	fm^{-3}	7.92405959E-15	1.00000000E+00	305
Y_q	Charge Fraction		2.29096E-02	0.14030E+00	1

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

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
10	n
11	p
0	e^-
100	Λ
110	Σ^-
111	Σ^0
112	Σ^+
120	Ξ^-
121	Ξ^0
	- end of table -

further particle sets are not defined.

eos.micro : not available

Description of Phases

The transitions in the crust and from the core to the crust are treated by simple matching of the different EoS at a given density.