

# GM1 Y6

## EoS Submission Details

EoS name	GM1 Y6
category	hadronic
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sheet creation date	December 16, 2014

## Abstract

This EoS is the classical RMF parameterisation GM1 [1] for cold neutron star matter in  $\beta$ -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  $n_B = 10^{-3}\text{fm}^{-3}$ . Hadronic charge fraction and compositional information is available for the core only.

## References to the original work

1. N. K. Glendenning and S. A. Moszkowski, Phys. Rev. Lett. **67**, 2414 (1991)
2. M. Oertel, C. Providência, F. Gulminelli, A. Raduta, arxiv:1412.4545.
3. F. Douchin, P. Haensel, Astronomy and Astrophysics **380**, 151 (2001).

## Nuclear Matter Properties<sup>1</sup>

	Quantity	Unit	
$n_S$	saturation density in symmetric matter	$\text{fm}^{-3}$	0.153
$E_0$	binding energy per baryon at saturation	MeV	16.3
$K$	incompressibility	MeV	300
$K'$	skewness	MeV	0.0
$J$	symmetry energy	MeV	32.5
$L$	symmetry energy slope parameter	MeV	94
$K_{sym}$	symmetry incompressibility	MeV	0.0

## Neutron Star Properties<sup>1</sup>

	Quantity	Unit	
$M_{max}$	maximum mass	$M_{\text{sun}}$	2.29
$M_{DU,e}$	mass at DUrca threshold (1/9) w/o $\mu^-$	$M_{\text{sun}}$	1.19
$R_{M_{max}}$	radius at maximum NS mass	km	12.13
$R_{1.4}$	radius at 1.4 $M_{\text{sun}}$ NS mass	km	13.78

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<sup>1</sup>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 336

Range and density (#) of the grid parameters:

	Quantity	Unit	min	max	#
T	Temperature	MeV	0.0	0.0	1
$n_b$	Baryon Nr Density	$\text{fm}^{-3}$	7.92405959E-15	1.11568987E+00	336
$Y_q$	Charge Fraction		5.81464E-05	0.1616187E+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	$\Lambda$
110	$\Sigma^-$
111	$\Sigma^0$
112	$\Sigma^+$
120	$\Xi^-$
121	$\Xi^0$
	- end of table -

**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.