STOS-TM1-v1-global

EoS Submission Details

EoS name	STOS-TM1-v1-global
category	hadronic
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Abstract

This table contains the EoS of H. Shen, H. Toki, K. Oyamatsu, and K. Sumiyoshi [1,2] with only baryonic contributions (no leptons or photons included) using a non-linear relativistic mean-field model with the TM1 parametrization [3] of the effective interaction. Non-uniform nuclear matter is calculated in the single-nucleus Thomas-Fermi approximation with parametrized density distributions in spherical Wigner-Seitz cells. Only neutrons, protons, α particles and a single heavy nucleus are considered. The present table is the original low-resolution 1998 version that was taken from the website `http://user.numazu-ct.ac.jp/~sumi/eos/` of K. Sumiyoshi. An update with higher resolution (STOS-TM1-v2-global) is available in the CompOSE database.

References to the original work

1. H. Shen, H. Toki, K. Oyamatsu, K. Sumiyoshi, Prog. Theor. Phys. 100 (1998) 1013

2. H. Shen, H. Toki, K. Oyamatsu, K. Sumiyoshi, Nucl. Phys. A 637 (1998) 435

Further References

3. Y. Sugahara, H. Toki, Nucl. Phys. A 579 (1994) 557

Nuclear Matter Properties[1]

	Quantity	Unit	
n_S	saturation density in symmetric matter	fm^{-3}	0.145
E_0	binding energy per baryon at saturation	MeV	16.26
K	incompressibility	MeV	281.16
K'	skewness	MeV	-285.22
J	symmetry energy	MeV	36.89
L	symmetry energy slope parameter	MeV	110.79
K_{sym}	symmetry incompressibility	MeV	33.62

Neutron Star Properties[1]

	Quantity	Unit	
M_{max}	maximum mass	$\mathrm{M_{sun}}$	0
$M_{DU,e}$	mass at DUrca threshold (1/9) w/o μ^-	$\mathrm{M_{sun}}$	0
$R_{M_{max}}$	radius at maximum NS mass	km	0
$R_{1.4}$	radius at 1.4 $\mathrm{M_{sun}}$ NS mass	km	0

[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	3
table type	1
total number of grid points	228904

Range and density (#) of the grid parameters:

	Quantity	Unit	min	max	#
T	Temperature	MeV	0.10000000E+00	0.10000000E+03	31
n_b	Baryon Nr Density	fm^{-3}	0.75814210E-10	0.17318560E+01	104
Y_q	Charge Fraction		0.10000000E-01	0.56234130E+00	71

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

additional quantities in eos.thermo

none defined

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
4002	$^{4}_{2}$He
	- end of table -

Further particle sets are defined. One set of quadruples for an average heavy nucleus. See Table 7.2 of the CompOSE manual.

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
	- end of table -	

Description of Phases

The different phase (uniform/non-uniform) in the description of the EoS are not distinguished.