

Akmal-Pandharipande-Ravenhall

EoS Submission Details

EoS name	Akmal-Pandharipande-Ravenhall
category	Hadronic
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Abstract

This table represents the zero temperature and β -equilibrium EoS by Akmal , Pandharipande and Ravenhall using variational techniques [1], interaction $A18+\delta v+UIX^*$. The transition to the pion condensed phase at high densities is modelled via an inhomogeneous mixed phase with a Gibbs construction, see chapter 5.12 of [2]. The inner crust is calculated with SLy4 [3], the outer crust from Baym, Pethick, Sutherland [4]. No compositional information is available.

References to the original work

1. A. Akmal, V.R. Pandharipande and D.G. Ravenhall, Phys. Rev. C 58 (1998) 1804.
2. P. Haensel, A.Y. Potekhin, D.G. Yakovlev, Neutron Stars 1: Equation of State and Structure, Springer, New York (2007).
3. F. Douchin, P. Haensel, Astronomy and Astrophysics 380 (2001), 151.
4. G. Baym, C. Pethick and P. Sutherland, Astrophys. J. 170 (1971) 299.

Nuclear Matter Properties¹

	Quantity	Unit	
n_S	saturation density in symmetric matter	fm^{-3}	0.16
E_0	binding energy per baryon at saturation	MeV	16.0
K	incompressibility	MeV	266.0
K'	skewness	MeV	–
J	symmetry energy	MeV	32.6
L	symmetry energy slope parameter	MeV	57.6
K_{sym}	symmetry incompressibility	MeV	–

Neutron Star Properties¹

	Quantity	Unit	
M_{max}	maximum mass	M_{sun}	2.19
$M_{DU,e}$	mass at DUrca threshold (1/9) w/o μ^-	M_{sun}	–
$R_{M_{max}}$	radius at maximum NS mass	km	9.97
$R_{1.4}$	radius at 1.4 M_{sun} NS mass	km	11.37
$\tilde{\Lambda}$	tidal deformability for a NS with $M = 1.4M_{sun}$	–	–

eos.thermo

eos.thermo and the three grid defining files are ComPOSE standard data files and by definition available.

table dimension	1
table type	1
total number of grid points	172

¹0-values indicate, that the corresponding data is not provided.

Range and density (#) of the grid parameters:

	Quantity	Unit	min	max	#
T	Temperature	MeV	0	0	1
n_b	Baryon Nr Density	fm^{-3}	7.924e-15	1.34	172
Y_q	Charge Fraction		0	0	1

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