

## Sifat-sifat bintang neutron berotasi lambat

Kasmudin, author

Deskripsi Lengkap: <https://lib.ui.ac.id/detail?id=20236358&lokasi=lokal>

---

### Abstrak

Dipelajari sifat-sifat bintang neutron statik dan berotasi dengan menggunakan pendekatan medan rata-rata relativistik dengan menggunakan parameter set NL3, TM1, FSUGold, FSUGZ03, dan FSUGZ06. Tekanan materi nuklir pada kerapatan tinggi yang diperoleh dengan menggunakan parameter set NL3 bersifat paling stiff sedangkan FSUGZ06 bersifat paling soft. Relasi massa dan jari-jari bintang neutron diperoleh dengan menyelesaikan persamaan Tollman-Oppenheimer-Volkoff (TOV) dengan input persamaan keadaan, baik dengan atau tanpa crust. Prediksi sifat-sifat bintang neutron statik berdasarkan model medan rata-rata relativistik menghasilkan massa maksimum berkisar antara 1,720 M -2,771 M, sedangkan jari-jari antara 10,963 km - 13,356 km, juga kerapatan jumlah barion pada titik saturasi antara 0,145 fm<sup>3</sup> - 0,151 fm<sup>3</sup>. Kerapatan jumlah barion di pusat bintang neutron pada saat massanya maksimum berkisar antara 0,668 fm<sup>3</sup> - 1,181 fm<sup>3</sup> dan kerapatan jumlah barion di daerah transisi dari materi homogen ke materi inhomogen antara 0,049 fm<sup>3</sup> - 0,074 fm<sup>3</sup>, sedangkan tekanan materi nuklir pada daerah transisi tersebut berkisar antara 0,177 MeV fm<sup>3</sup> - 0,368 MeV fm<sup>3</sup>. Prediksi momen inersia, momen kuadrupol, eliptisitas equator, dan amplitudo regangan gelombang gravitasi juga dipelajari.

.....

Static and rotating neutron star properties prediction based on relativistic mean-field (RMF) approximation using NL3, TM1, FSUGold, FSUGZ03, and FSUGZ06 parameter sets have been studied. Pressure of nuclear matter at high densities predicted by NL3 parameter set is the stiffest, but FSUGZ06 is the softest. The mass and radius relation of neutron stars are obtained by solving Tollman-Oppenheimer-Volkoff (TOV) equation where the input is equation of state of neutron star matter and with or without taking into account the neutron star crust. RMF parameter sets predict the value of maximum mass between 1,720 M - 2,771 M, while the radius between 10,963 km - 13,356 km, as well as the value of barion number density at saturation point between 0,145 fm<sup>3</sup> - 0,151 fm<sup>3</sup>. The value of barion number density at central of neutron star with maximum mass is between 0,668 fm<sup>3</sup> - 1,181 fm<sup>3</sup> and the barion number density at transition region from core to crust is between 0,049 fm<sup>3</sup> - 0,074 fm<sup>3</sup>, while the corresponding pressure is between 0,177 MeV fm<sup>3</sup> - 0,368 MeV fm<sup>3</sup>. The neutron stars inertia moment, quadrupole moment, equatorial ellipticity, and gravitational-wave strain amplitude predicted by RMF model also have been discussed.