

NewCompStar School 2016 - “Neutron stars: gravitational physics theory and observations”



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Effect of the Magnetic Field on the Dense Matter EoS

Wednesday, September 7, 2016 2:30 PM (1h 30m)

I will present a lecture about the modifications introduced in the EOS of dense by the presence of strong magnetic fields. We know that magnetic fields of up to 10^{15} G have been measured on the surface of neutron stars and a field of 10^{16} have been measured somewhere inside a neutron star. We speculate further that magnetic fields of more than 10^{18} Gauss can exist in the center of massive stars. In this case, the equation of state becomes anisotropic, presenting a larger component of the pressure in the direction parallel to the magnetic field. Eventually, such anisotropy is overturned by the pure field contribution to the pressure, which is larger in the direction perpendicular to the magnetic field and turns the star oblate. Nevertheless, strong magnetic field corrections to the EOS can change the macroscopic properties of stars. First, I will introduce the magnetic field formalism in a relativistic Fermi gas, followed by anomalous magnetic moment corrections, finite temperature, numerical procedures and, finally, results for a more realistic model within the context of general relativity.

Summary

Presenter: Dr DEXHEIMER, V. (Kent State University)