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Thermodynamics of a magnetized neutral vector bosons gas

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This poster is dedicated to study the thermodynamic properties of a magnetized neutral vector boson gas at any temperature, with the aim to provide equations of state that allow more general and precise descriptions of astrophysical phenomena. The all-temperature analytical expressions for the thermodynamic magnitudes, as well as their non-relativistic limits, are obtained starting from the energy spectrum given by Proca's theory. With these expressions, and considering the system under astrophysical conditions (particle densities, temperatures and magnetic fields in the order of the estimated for Neutron Stars), we investigate the Bose-Einstein condensation, the magnetic properties and the equations of state of the gas, making a special emphasis on the influence of antiparticles and magnetic field. In all cases, the results are compared with their analogues in the low temperature and the non-relativistic limits. This allows us to establish the ranges of validity of these approximations and to achieve a better understanding of their effects on the studied system.

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