

Compact objects in Einstein-Cartan theory: the effects of intrinsic spin in celestial bodies

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We generalize the Tolman-Oppenheimer-Volkoff equations for space-times endowed with a Weyssenhoff like torsion field in the Einstein-Cartan theory. The new set of structure equations clearly show how the presence of torsion affects the geometry of the space-time, in particular it is found that torsion directly couples to the magnetic parts of the Weyl tensor rendering them non-trivial. We study some exact solutions for compact objects with non-null torsion and discuss how these should be smoothly matched to an exterior space-time. We also extend the analysis for the Buchdahl limit, showing how the presence of intrinsic spin affects the maximum allowed compactness of an astrophysical body.

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