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Non-Spherical Stellar Models of Compact Stars OMAIR ZUBAIRI, Computational Science Research Center and Deparment of Physics, San Diego State Univeristy, FRIDOLIN WEBER, Department of Physcs, San Diego State Univeristy and Center for Astrophysics and Space Sciences, University of California San Diego, EFRAIN FERRER, VIVIAN INCERA, Department of Physics, University of Texas at El Paso — Conventionally, the structure of compact stellar objects such as neutron or quark stars are modeled with the assumption that they are perfect spheres. However, due to high magnetic fields, certain classes of compact stars (such as magnetars and neutron stars containing cores of color-superconducting quark matter) are expected to be deformed (non-spherical) making them ob-longed spheroids. In this work, we seek to investigate the stellar structure of these such deformed compact objects in the framework of general relativity. Using a metric that describes a non-spherical mass distribution, we derive the stellar structures equations of these non-spherical compact objects. Since we do not have spherical symmetry, we need to take into the account the pressure gradient not only in the radial but in the polar direction as well. We then calculate stellar properties such as mass and radii along with density and pressure profiles for neutron stars with high magnetic fields and investigate any changes from the standard spherical models.

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