

References

- (2021). . <http://www2.latech.edu/rakithab/project/rex>.
- Abbott, B. P., Abbott, R., Abbott, T. D., Abernathy, M. R., Acernese, F., Ackley, K., Adams, C., Adams, T., Addesso, P., Adhikari, R. X., and et al. (2016). Observation of Gravitational Waves from a Binary Black Hole Merger. *Phys. Rev. Lett.*, 116(6):061102.
- Abbott, B. P., Abbott, R., Abbott, T. D., Abraham, S., Acernese, F., Ackley, K., et al. (2020a). GW190425: Observation of a Compact Binary Coalescence with Total Mass $\sim 3.4 M_{\odot}$. *Astro. Phys. J. Lett.*, 892(1):L3.
- Abbott, B. P., Abbott, R., Abbott, T. D., Acernese, F., Ackley, K., Adams, C., et al. (2017a). Gravitational Waves and Gamma-Rays from a Binary Neutron Star Merger: GW170817 and GRB 170817A. *Astro. Phys. J. Lett.*, 848(2):L13.
- Abbott, B. P., Abbott, R., Abbott, T. D., Acernese, F., Ackley, K., Adams, C., et al. (2017b). Multi-messenger Observations of a Binary Neutron Star Merger. *Astro. Phys. J. Lett.*, 848(2):L12.
- Abbott, B. P., Abbott, R., Abbott, T. D., Acernese, F., Ackley, K., Adams, C., et al. (2019). Properties of the Binary Neutron Star Merger GW170817. *Physical Review X*, 9(1):011001.
- Abbott, B. P., Abbott, R., Abbott, T. D., Acernese, F., Ackley, K., Adams, C., LIGO Scientific Collaboration, and Virgo Collaboration (2018). GW170817: Measurements of Neutron Star Radii and Equation of State. *Phys. Rev. Lett.*, 121(16):161101.
- Abbott, B. P., Abbott, R., Abbott, T. D., Acernese, F., Ackley, K., Adams, C., LIGO Scientific Collaboration, Virgo Collaboration, et al. (2017c). GW170817: Observation of Gravitational Waves from a Binary Neutron Star Inspiral. *Phys. Rev. Lett.*, 119(16):161101.
- Abbott, R., Abbott, T. D., Abraham, S., Acernese, F., Ackley, K., Adams, A., et al. (2021). Observation of Gravitational Waves from Two Neutron Star-Black Hole Coalescences. *Astro. Phys. J. Lett.*, 915(1):L5.
- Abbott, R., Abbott, T. D., Abraham, S., Acernese, F., Ackley, K., Adams, C., et al. (2020b). GW190814: Gravitational Waves from the Coalescence of a 23 Solar Mass Black Hole with a 2.6 Solar Mass Compact Object. *Astro. Phys. J. Lett.*, 896(2):L44.
- Abrahamyan, S., Ahmed, Z., Albataineh, H., Aniol, K., Armstrong, D. S., Armstrong, W., et al. (2012). Measurement of the Neutron Radius of Pb208 through Parity Violation in Electron Scattering. *Phys. Rev. Lett.*, 108(11):112502.
- Acernese, F., Agathos, M., Agatsuma, K., Aisa, D., Allemandou, N., Allocca, A., et al. (2015). Advanced Virgo: a second-generation interferometric gravitational wave detector. *Classical and Quantum Gravity*, 32(2):024001.
- Adhikari, D., Albataineh, H., Androic, D., Aniol, K., Armstrong, D. S., Averett, T., et al. (2021). Accurate Determination of the Neutron Skin Thickness of ^{208}Pb through Parity-Violation in Electron Scattering. *Phys. Rev. Lett.*, 126(17):172502.
- Akmal, A., Pandharipande, V. R., and Ravenhall, D. G. (1998). Equation of state of nucleon matter and neutron star structure. *Phys. Rev. C*, 58(3):1804–1828.
- Alpar, M. A. (1977). Pinning and Threading of Quantized Vortices in the Pulsar Crust Superfluid. *Astro. Phys. J.*, 213:527–530.

- Ambartsumyan, V. A. and Saakyan, G. S. (1960). The Degenerate Superdense Gas of Elementary Particles. *Sov. Astron.*, 4:187.
- Anderson, P. W. and Itoh, N. (1975). Pulsar glitches and restlessness as a hard superfluidity phenomenon. *Nature*, 256(5512):25–27.
- Antoniadis, J., Freire, P. C. C., Wex, N., Tauris, T. M., Lynch, R. S., van Kerkwijk, M. H., Kramer, M., Bassa, C., Dhillon, V. S., Driebe, T., Hessels, J. W. T., Kaspi, V. M., Kondratiev, V. I., Langer, N., Marsh, T. R., McLaughlin, M. A., Pennucci, T. T., Ransom, S. M., Stairs, I. H., van Leeuwen, J., Verbiest, J. P. W., and Whelan, D. G. (2013). A Massive Pulsar in a Compact Relativistic Binary. *Science*, 340(6131):448.
- Arzoumanian, Z. et al. (2018). The NANOGrav 11-year Data Set: High-precision timing of 45 Millisecond Pulsars. *ApJ Suppl.*, 235(2):37.
- Baade, W. and Zwicky, F. (1934a). Cosmic rays from super-novae. *Proceedings of the National Academy of Sciences*, 20(5):259–263.
- Baade, W. and Zwicky, F. (1934b). On super-novae. *Proceedings of the National Academy of Sciences*, 20(5):254–259.
- Baillet d’Etivaux, N., Guillot, S., Margueron, J., Webb, N., Catelan, M., and Reisenegger, A. (2019). New Constraints on the Nuclear Equation of State from the Thermal Emission of Neutron Stars in Quiescent Low-mass X-Ray Binaries. *Astro. Phys. J.*, 887(1):48.
- Balberg, S. and Gal, A. (1997). An effective equation of state for dense matter with strangeness. *Nuc. Phys. A*, 625:435–472.
- Baldo, M., Burgio, G. F., and Schulze, H. J. (1998). Onset of hyperon formation in neutron star matter from Brueckner theory. *Phys. Rev. C*, 58(6):3688–3695.
- Bandyopadhyay, D., Chakrabarty, S., and Pal, S. (1997). Quantizing Magnetic Field and Quark-Hadron Phase Transition in a Neutron Star. *Phys. Rev. Lett.*, 79(12):2176–2179.
- Banik, S. and Bandyopadhyay, D. (2001). Third family of superdense stars in the presence of antikaon condensates. *Phys. Rev. C*, 64(5):055805.
- Bao, S. S. and Shen, H. (2014). Influence of the symmetry energy on nuclear “pasta” in neutron star crusts. *Phys. Rev. C*, 89(4):045807.
- Basu, A., Shaw, B., Antonopoulou, D., Keith, M. J., Lyne, A. G., Mickaliger, M. B., Stappers, B. W., Weltevrede, P., and Jordan, C. A. (2021). The jodrell bank glitch catalogue: 106 new rotational glitches in 70 pulsars. *Mon. Not. Roy. Astron. Soc.*
- Baym, G., Bethe, H. A., and Pethick, C. J. (1971a). Neutron star matter. *Nuc. Phys. A*, 175(2):225–271.
- Baym, G., Pethick, C., Pines, D., and Ruderman, M. (1969). Spin Up in Neutron Stars : The Future of the Vela Pulsar. *Nature*, 224(5222):872–874.
- Baym, G., Pethick, C., and Sutherland, P. (1971b). The Ground State of Matter at High Densities: Equation of State and Stellar Models. *Astro. Phys. J.*, 170:299.
- Beloborodov, A. M. (2020). Blast Waves from Magnetar Flares and Fast Radio Bursts. *Astro. Phys. J.*, 896(2):142.
- Beniamini, P., Wadiasingh, Z., and Metzger, B. D. (2020). Periodicity in recurrent fast radio bursts and the origin of ultralong period magnetars. *Mon. Not. Roy. Astron. Soc.*, 496(3):3390–3401.
- Bildsten, L., Salpeter, E. E., and Wasserman, I. (1992). The Fate of Accreted CNO Elements in Neutron Star Atmospheres: X-Ray Bursts and Gamma-Ray Lines. *Astro. Phys. J.*, 384:143.
- Binnington, T. and Poisson, E. (2009). Relativistic theory of tidal Love numbers. *Phys. Rev. D*, 80(8):084018.
- Biswas, B. (2021). Impact of PREX-II and Combined Radio/NICER/XMM-Newton’s Mass-radius Measurement of PSR J0740+6620 on the Dense-matter Equation of State. *Astro. Phys. J.*, 921(1):63.

- Bocquet, M., Bonazzola, S., Gourgoulhon, E., and Novak, J. (1995). Rotating neutron star models with a magnetic field. *Astronomy & Astrophysics*, 301:757.
- Bodmer, A. R. (1971). Collapsed nuclei. *Phys. Rev. D*, 4:1601–1606.
- Boguta, J. and Bodmer, A. R. (1977). Relativistic calculation of nuclear matter and the nuclear surface. *Nuc. Phys. A*, 292(3):413–428.
- Bombaci, I., Drago, A., Logoteta, D., Pagliara, G., and Vidaña, I. (2021). Was GW190814 a Black Hole-Strange Quark Star System? *Phys. Rev. Lett.*, 126(16):162702.
- Bonanno, L. and Sedrakian, A. (2012). Composition and stability of hybrid stars with hyperons and quark color-superconductivity. *Astronomy & Astrophysics*, 539:A16.
- Bonazzola, S., Gourgoulhon, E., Salgado, M., and Marck, J. A. (1993). Axisymmetric rotating relativistic bodies: A new numerical approach for 'exact' solutions. *Astronomy & Astrophysics*, 278(2):421–443.
- Bonazzola, S. and Schneider, J. (1974). An Exact Study of Rigidly and Rapidly Rotating Stars in General Relativity with Application to the Crab Pulsar. *Astro. Phys. J.*, 191:273–290.
- Boynton, P. E., Groth, E. J., Hutchinson, D. P., Nanos, G. P., J., Partridge, R. B., and Wilkinson, D. T. (1972). Optical Timing of the Crab Pulsar, NP 0532. *Astro. Phys. J.*, 175:217.
- Broderick, A., Prakash, M., and Lattimer, J. M. (2000). The Equation of State of Neutron Star Matter in Strong Magnetic Fields. *Astro. Phys. J.*, 537(1):351–367.
- Brown, G. E., Lee, C.-H., Rho, M., and Thorsson, V. (1994). From kaon-nuclear interactions to kaon condensation. *Nuc. Phys. A*, 567(4):937–956.
- Butterworth, E. M. and Ipser, J. R. (1976). On the structure and stability of rapidly rotating fluid bodies in general relativity. I. The numerical method for computing structure and its application to uniformly rotating homogeneous bodies. *Astro. Phys. J.*, 204:200–223.
- Cai, B.-J., Fattoyev, F. J., Li, B.-A., and Newton, W. G. (2015). Critical density and impact of Δ (1232) resonance formation in neutron stars. *Phys. Rev. C*, 92(1):015802.
- Cameron, A. G. W. (1959). Pycnonuclear Reactions and Nova Explosions. *Astro. Phys. J.*, 130:916.
- Cardall, C. Y., Prakash, M., and Lattimer, J. M. (2001). Effects of Strong Magnetic Fields on Neutron Star Structure. *Astro. Phys. J.*, 554(1):322–339.
- Carlson, J., Gandolfi, S., Pederiva, F., Pieper, S. C., Schiavilla, R., Schmidt, K. E., and Wiringa, R. B. (2015). Quantum Monte Carlo methods for nuclear physics. *Reviews of Modern Physics*, 87(3):1067–1118.
- Cavagnoli, R., Menezes, D. P., and Providência, C. (2011). Neutron star properties and the symmetry energy. *Phys. Rev. C*, 84(6):065810.
- Centelles, M., Roca-Maza, X., Viñas, X., and Warda, M. (2009). Nuclear Symmetry Energy Probed by Neutron Skin Thickness of Nuclei. *Phys. Rev. Lett.*, 102(12):122502.
- Chadwick, J. (1932). The existence of a neutron. *Proceedings of the Royal Society of London. Series A, Containing Papers of a Mathematical and Physical Character*, 136(830):692–708.
- Chakrabarty, S., Bandyopadhyay, D., and Pal, S. (1997). Dense Nuclear Matter in a Strong Magnetic Field. *Phys. Rev. Lett.*, 78(15):2898–2901.
- Chamel, N., Fantina, A. F., Zdunik, J. L., and Haensel, P. (2015). Neutron drip transition in accreting and nonaccreting neutron star crusts. *Phys. Rev. C*, 91:055803.
- Chamel, N. and Haensel, P. (2008). Physics of Neutron Star Crusts. *Living Reviews in Relativity*, 11(1):10.
- Char, P. and Banik, S. (2014). Massive neutron stars with antikaon condensates in a density-dependent hadron field theory. *Phys. Rev. C*, 90(1):015801.
- Chatterjee, D. and Bandyopadhyay, D. (2008). Hyperon Bulk Viscosity in the Presence of Antikaon Condensate. *Astro. Phys. J.*, 680(1):686–694.

- Chatterjee, D., Novak, J., and Oertel, M. (2019). Magnetic field distribution in magnetars. *Phys. Rev. C*, 99(5):055811.
- Chatterjee, D. and Vidaña, I. (2016). Do hyperons exist in the interior of neutron stars? *European Physical Journal A*, 52:29.
- Chen, W., Zhang, P.-Q., and Liu, L.-G. (2007). The Influence of the Magnetic Field on the Properties of Neutron Star Matter. *Modern Physics Letters A*, 22(7-10):623–629.
- Chen, W.-C. and Piekarewicz, J. (2014). Building relativistic mean field models for finite nuclei and neutron stars. *Phys. Rev. C*, 90(4):044305.
- Chen, Y., Guo, H., and Liu, Y. (2007). Neutrino scattering rates in neutron star matter with Δ isobars. *Phys. Rev. C*, 75:035806.
- Cioffi, R., Ferrari, V., and Gualtieri, L. (2010). Structure and deformations of strongly magnetized neutron stars with twisted-torus configurations. *Mon. Not. Roy. Astron. Soc.*, 406(4):2540–2548.
- Cioffi, R., Ferrari, V., Gualtieri, L., and Pons, J. A. (2009). Relativistic models of magnetars: the twisted torus magnetic field configuration. *Mon. Not. Roy. Astron. Soc.*, 397(2):913–924.
- Cioffi, R. and Rezzolla, L. (2013). Twisted-torus configurations with large toroidal magnetic fields in relativistic stars. *Mon. Not. Roy. Astron. Soc.*, 435:L43–L47.
- Colucci, G. and Sedrakian, A. (2013). Equation of state of hypernuclear matter: Impact of hyperon-scalar-meson couplings. *Phys. Rev. C*, 87(5):055806.
- Coulter, D. A., Foley, R. J., Kilpatrick, C. D., Drout, M. R., Piro, A. L., Shappee, B. J., Siebert, M. R., Simon, J. D., Ulloa, N., Kasen, D., Madore, B. F., Murguía-Berthier, A., Pan, Y. C., Prochaska, J. X., Ramirez-Ruiz, E., Rest, A., and Rojas-Bravo, C. (2017). Swope Supernova Survey 2017a (SSS17a), the optical counterpart to a gravitational wave source. *Science*, 358(6370):1556–1558.
- Cozma, M. D. and Tsang, M. B. (2021). In-medium Δ (1232) potential, pion production in heavy-ion collisions and the symmetry energy. *European Physical Journal A*, 57(11):309.
- CREX Collaboration (2021). . *APR21 Meeting (APS)*.
- Cromartie, H. T., Fonseca, E., Ransom, S. M., Demorest, P. B., Arzoumanian, Z., Blumer, H., Brook, P. R., DeCesar, M. E., Dolch, T., Ellis, J. A., Ferdman, R. D., Ferrara, E. C., Garver-Daniels, N., Gentile, P. A., Jones, M. L., Lam, M. T., Lorimer, D. R., Lynch, R. S., McLaughlin, M. A., Ng, C., Nice, D. J., Pennucci, T. T., Spiewak, R., Stairs, I. H., Stovall, K., Swiggum, J. K., and Zhu, W. W. (2020). Relativistic Shapiro delay measurements of an extremely massive millisecond pulsar. *Nature Astronomy*, 4:72–76.
- Cutler, C., Apostolatos, T. A., Bildsten, L., Finn, L. S., Flanagan, E. E., Kennefick, D., Markovic, D. M., Ori, A., Poisson, E., Sussman, G. J., and Thorne, K. S. (1993). The last three minutes: Issues in gravitational-wave measurements of coalescing compact binaries. *Phys. Rev. Lett.*, 70(20):2984–2987.
- Damour, T. and Nagar, A. (2010). Effective one body description of tidal effects in inspiralling compact binaries. *Phys. Rev. D*, 81(8):084016.
- Danielewicz, P., Lacey, R., and Lynch, W. G. (2002). Determination of the Equation of State of Dense Matter. *Science*, 298(5598):1592–1596.
- Dapo, H., Schaefer, B. J., and Wambach, J. (2010). Appearance of hyperons in neutron stars. *Phys. Rev. C*, 81(3):035803.
- de Jong, F. and Lenske, H. (1998). Asymmetric nuclear matter in the relativistic Brueckner-Hartree-Fock approach. *Phys. Rev. C*, 57(6):3099–3107.
- de Paoli, M. G., Castro, L. B., Menezes, D. P., and Barros, C. C., J. (2013). Rarita-Schwinger particles under the influence of strong magnetic fields. *Journal of Physics G Nuclear Physics*, 40(5):055007.
- Demorest, P. B., Pennucci, T., Ransom, S. M., Roberts, M. S. E., and Hessels, J. W. T. (2010).

- A two-solar-mass neutron star measured using Shapiro delay. *Nature*, 467(7319):1081–1083.
- Dexheimer, V., Gomes, R. O., Klähn, T., Han, S., and Salinas, M. (2021). GW190814 as a massive rapidly rotating neutron star with exotic degrees of freedom. *Phys. Rev. C*, 103(2):025808.
- Di Gallo, L., Oertel, M., and Urban, M. (2011). Collective excitations in the neutron star inner crust. *Phys. Rev. C*, 84:045801.
- Dietrich, T., Coughlin, M. W., Pang, P. T. H., Bulla, M., Heinzl, J., Issa, L., Tews, I., and Antier, S. (2020). Multimessenger constraints on the neutron-star equation of state and the Hubble constant. *Science*, 370(6523):1450–1453.
- Ding, W. B., Liu, G. Z., Zhu, M. F., Yu, Z., and Zhao, E. G. (2009). The influence of antikaon condensations on neutrino emissivity from neutron stars. *Astronomy & Astrophysics*, 506(2):L13–L16.
- Douchin, F. and Haensel, P. (2001). A unified equation of state of dense matter and neutron star structure. *Astronomy & Astrophysics*, 380:151–167.
- Drago, A., Lavagno, A., and Pagliara, G. (2014). Can very compact and very massive neutron stars both exist? *Phys. Rev. D*, 89(4):043014.
- Drago, A., Lavagno, A., Pagliara, G., and Pigato, D. (2014). Early appearance of Δ isobars in neutron stars. *Phys. Rev. C*, 90:065809.
- Drago, A., Lavagno, A., Pagliara, G., and Pigato, D. (2014). Early appearance of Δ isobars in neutron stars. *Phys. Rev. C*, 90(6):065809.
- Ducoin, C., Margueron, J., and Providência, C. (2010). Nuclear symmetry energy and core-crust transition in neutron stars: A critical study. *EPL (Europhysics Letters)*, 91(3):32001.
- Duerr, H.-P. (1956). Relativistic effects in nuclear forces. *Phys. Rev.*, 103:469–480.
- Espinoza, C. M., Lyne, A. G., Stappers, B. W., and Kramer, M. (2011). A study of 315 glitches in the rotation of 102 pulsars. *Mon. Not. Roy. Astron. Soc.*, 414(2):1679–1704.
- Fattoyev, F. J., Horowitz, C. J., Piekarewicz, J., and Reed, B. (2020). GW190814: Impact of a 2.6 solar mass neutron star on the nucleonic equations of state. *Phys. Rev. C*, 102(6):065805.
- Fattoyev, F. J., Piekarewicz, J., and Horowitz, C. J. (2018). Neutron Skins and Neutron Stars in the Multimessenger Era. *Phys. Rev. Lett.*, 120(17):172702.
- Feliciello, A. and Nagae, T. (2015). Experimental review of hypernuclear physics: recent achievements and future perspectives. *Reports on Progress in Physics*, 78(9):096301.
- Fonseca, E., Cromartie, H. T., Pennucci, T. T., Ray, P. S., Kirichenko, A. Y., Ransom, S. M., Demorest, P. B., et al. (2021). Refined Mass and Geometric Measurements of the High-mass PSR J0740+6620. *Astro. Phys. J. Lett.*, 915(1):L12.
- Fortin, M., Providência, C., Raduta, A. R., Gulminelli, F., Zdunik, J. L., Haensel, P., and Bejger, M. (2016). Neutron star radii and crusts: Uncertainties and unified equations of state. *Phys. Rev. C*, 94(3):035804.
- Friedman, E. and Gal, A. (2021). Constraints on Ξ^- nuclear interactions from capture events in emulsion. *Physics Letters B*, 820:136555.
- Friedman, E., Gal, A., Mareš, J., and Cieplý, A. (1999). K^- -nucleus relativistic mean field potentials consistent with kaonic atoms. *Phys. Rev. C*, 60(2):024314.
- Fuchs, C. (2006). $pp \rightarrow K\pi$ production in heavy ion reactions at intermediate energies [review article]. *Progress in Particle and Nuclear Physics*, 56(1):1–103.
- Fuchs, C., Lenske, H., and Wolter, H. H. (1995). Density dependent hadron field theory. *Phys. Rev. C*, 52(6):3043–3060.
- Gal, A., Hungerford, E. V., and Millener, D. J. (2016). Strangeness in nuclear physics. *Reviews of Modern Physics*, 88(3):035004.
- Gell-Mann, M. (1964). A schematic model of baryons and mesons. *Physics Letters*, 8(3):214–215.

- Giacconi, R., Gursky, H., Kellogg, E., Schreier, E., and Tananbaum, H. (1971). Discovery of Periodic X-Ray Pulsations in Centaurus X-3 from UHURU. *Astro. Phys. J.*, 167:L67.
- Glendenning, N. K. (1985). Neutron stars are giant hypernuclei ? *Astro. Phys. J.*, 293:470–493.
- Glendenning, N. K. (1992). First-order phase transitions with more than one conserved charge: Consequences for neutron stars. *Phys. Rev. D*, 46(4):1274–1287.
- Glendenning, N. K. (1996). *Compact Stars: Nuclear Physics, Particle Physics and General Relativity*, volume 2nd ed. Springer-Verlag, New York, USA.
- Glendenning, N. K. and Moszkowski, S. A. (1991). Reconciliation of neutron-star masses and binding of the Lambda in hypernuclei. *Phys. Rev. Lett.*, 67:2414–1417.
- Glendenning, N. K. and Schaffner-Bielich, J. (1998). Kaon Condensation and Dynamical Nucleons in Neutron Stars. *Phys. Rev. Lett.*, 81(21):4564–4567.
- Glendenning, N. K. and Schaffner-Bielich, J. (1999). First order kaon condensate. *Phys. Rev. C*, 60(2):025803.
- Godzieba, D. A., Gamba, R., Radice, D., and Bernuzzi, S. (2021). Updated universal relations for tidal deformabilities of neutron stars from phenomenological equations of state. *Phys. Rev. D*, 103:063036.
- Gold, T. (1968). Rotating neutron stars as the origin of the pulsating radio sources. *Nature*, 218(5143):731–732.
- Gomes, R. O., Dexheimer, V., Schramm, S., and Vasconcellos, C. A. Z. (2015). Many-body Forces in the Equation of State of Hyperonic Matter. *Astro. Phys. J.*, 808(1):8.
- Guillot, S. and Rutledge, R. E. (2014). Rejecting Proposed Dense Matter Equations of State with Quiescent Low-mass X-Ray Binaries. *Astro. Phys. J. Lett.*, 796(1):L3.
- Guillot, S., Servillat, M., Webb, N. A., and Rutledge, R. E. (2013). Measurement of the Radius of Neutron Stars with High Signal-to-noise Quiescent Low-mass X-Ray Binaries in Globular Clusters. *Astro. Phys. J.*, 772(1):7.
- Haensel, P. (2001). *Neutron Star Crusts*, volume 578, page 127.
- Haensel, P., Potekhin, A. Y., and Yakovlev, D. G. (2007). *Neutron stars 1: Equation of state and structure*, volume 326. Springer, New York, USA.
- Harding, A. K. and Lai, D. (2006). Physics of strongly magnetized neutron stars. *Reports on Progress in Physics*, 69(9):2631–2708.
- Harrison, B., Wakano, M., and Wheeler, J. (1958). Matter-energy at high density: end point of thermonuclear evolution. *La Structure et Évolution de l'Univers* (R. Stoops, Brussels), pages 124–140.
- Hartle, J. B. (1967). Slowly Rotating Relativistic Stars. I. Equations of Structure. *Astro. Phys. J.*, 150:1005.
- Hartle, J. B. and Thorne, K. S. (1968). Slowly Rotating Relativistic Stars. II. Models for Neutron Stars and Supermassive Stars. *Astro. Phys. J.*, 153:807.
- Heiselberg, H. and Hjorth-Jensen, M. (2000). Phases of dense matter in neutron stars. *Phys. Rep.*, 328(5-6):237–327.
- Hessels, J. W. T., Ransom, S. M., Stairs, I. H., Freire, P. C. C., Kaspi, V. M., and Camilo, F. (2006). A Radio Pulsar Spinning at 716 Hz. *Science*, 311(5769):1901–1904.
- Hewish, A., Bell, S. J., Pilkington, J. D. H., Scott, P. F., and Collins, R. A. (1968). Observation of a rapidly pulsating radio source. *Nature*, 217(5130):709–713.
- Hinderer, T. (2008). Tidal Love Numbers of Neutron Stars. *Astro. Phys. J.*, 677(2):1216–1220.
- Hinderer, T., Lackey, B. D., Lang, R. N., and Read, J. S. (2010). Tidal deformability of neutron stars with realistic equations of state and their gravitational wave signatures in binary inspiral. *Phys. Rev. D*, 81(12):123016.
- Hu, J., Bao, S., Zhang, Y., Nakazato, K., Sumiyoshi, K., and Shen, H. (2020). Effects of symmetry energy on the radius and tidal deformability of neutron stars in the relativistic

- mean-field model. *Progress of Theoretical and Experimental Physics*, 2020(4):043D01.
- Hu, J., Zhang, Y., Epelbaum, E., Meißner, U.-G., and Meng, J. (2017). Nuclear matter properties with nucleon-nucleon forces up to fifth order in the chiral expansion. *Phys. Rev. C*, 96(3):034307.
- Hulse, R. A. and Taylor, J. H. (1975). Discovery of a pulsar in a binary system. *The Astrophysical Journal*, 195:L51–L53.
- Ivanenko, D. D. and Kurdgelaidze, D. F. (1965). Hypothesis concerning quark stars. *Astrophysics*, 1(4):251–252.
- Ji, F., Hu, J., Bao, S., and Shen, H. (2019). Effects of nuclear symmetry energy and equation of state on neutron star properties. *Phys. Rev. C*, 100(4):045801.
- Jiang, J.-L., Tang, S.-P., Wang, Y.-Z., Fan, Y.-Z., and Wei, D.-M. (2020). PSR J0030+0451, GW170817, and the Nuclear Data: Joint Constraints on Equation of State and Bulk Properties of Neutron Stars. *Astro. Phys. J.*, 892(1):55.
- Jie Li, J., Sedrakian, A., and Weber, F. (2020). Rapidly rotating Δ -resonance-admixed hypernuclear compact stars. *Physics Letters B*, 810:135812.
- Johnson, M. H. and Teller, E. (1955). Classical field theory of nuclear forces. *Phys. Rev.*, 98:783–787.
- Kanakis-Pegios, A. and Moustakidis, C. (2020). Constraints on neutron stars equation of state using the tidal deformability derived from bns mergers. *HNPS Advances in Nuclear Physics*, 27(0):95–100.
- Kaplan, D. B. and Nelson, A. E. (1988). Kaon condensation in dense matter. *Nuc. Phys. A*, 479:273–284.
- Kasliwal, M. M., Kasen, D., Lau, R. M., Perley, D. A., Rosswog, S., Ofek, E. O., Hotokezaka, K., Chary, R.-R., Sollerman, J., Goobar, A., and Kaplan, D. L. (2022). Spitzer mid-infrared detections of neutron star merger GW170817 suggests synthesis of the heaviest elements. *Mon. Not. Roy. Astron. Soc.*, 510(1):L7–L12.
- Kirson, M. W. (2008). Mutual influence of terms in a semi-empirical mass formula. *Nuc. Phys. A*, 798(1):29–60.
- Klähn, T., Blaschke, D., Typel, S., van Dalen, E. N. E., Faessler, A., Fuchs, C., Gaitanos, T., Grigorian, H., Ho, A., Kolomeitsev, E. E., Miller, M. C., Röpke, G., Trümper, J., Voskresensky, D. N., Weber, F., and Wolter, H. H. (2006). Constraints on the high-density nuclear equation of state from the phenomenology of compact stars and heavy-ion collisions. *Phys. Rev. C*, 74(3):035802.
- Knorren, R., Prakash, M., and Ellis, P. J. (1995). Strangeness in hadronic stellar matter. *Phys. Rev. C*, 52(6):3470–3482.
- Koch, J. H. and Ohtsuka, N. (1985). Inclusive electron scattering from light nuclei at intermediate energies. *Nuc. Phys. A*, 435(3):765–790.
- Koch, V. (1994). K^- -proton scattering and the Λ (1405) in dense matter. *Physics Letters B*, 337(1-2):7–13.
- Kolomeitsev, E. E., Maslov, K. A., and Voskresensky, D. N. (2017). Delta isobars in relativistic mean-field models with σ -scaled hadron masses and couplings. *Nuc. Phys. A*, 961:106–141.
- Kubis, S. and Kutschera, M. (2003). Kaon condensates, nuclear symmetry energy and cooling of neutron stars. *Nuc. Phys. A*, 720(1-2):189–206.
- Lalazissis, G. A., Karatzikos, S., Fossion, R., Arteaga, D. P., Afanasjev, A. V., and Ring, P. (2009). The effective force NL3 revisited. *Physics Letters B*, 671(1):36–41.
- Lalazissis, G. A., König, J., and Ring, P. (1997). New parametrization for the Lagrangian density of relativistic mean field theory. *Phys. Rev. C*, 55(1):540–543.
- Lalazissis, G. A., Nikšić, T., Vretenar, D., and Ring, P. (2005). New relativistic mean-field interaction with density-dependent meson-nucleon couplings. *Phys. Rev. C*, 71(2):024312.

- Landau, L. (1932). On the theory of stars. *Physikalische Zeitschrift Sowjetunion*, 1:285–288.
- Landry, P., Essick, R., and Chatziioannou, K. (2020). Nonparametric constraints on neutron star matter with existing and upcoming gravitational wave and pulsar observations. *Phys. Rev. D*, 101(12):123007.
- Lattimer, J. M. (2019). Neutron star mass and radius measurements. *Universe*, 5(7).
- Lattimer, J. M. and Prakash, M. (2004). The Physics of Neutron Stars. *Science*, 304(5670):536–542.
- Lattimer, J. M. and Prakash, M. (2016). The equation of state of hot, dense matter and neutron stars. *Phys. Rep.*, 621:127–164.
- Lattimer, J. M. and Steiner, A. W. (2014a). Constraints on the symmetry energy using the mass-radius relation of neutron stars. *European Physical Journal A*, 50:40.
- Lattimer, J. M. and Steiner, A. W. (2014b). Neutron Star Masses and Radii from Quiescent Low-mass X-Ray Binaries. *Astro. Phys. J.*, 784(2):123.
- Le Fèvre, A., Leifels, Y., Reisdorf, W., Aichelin, J., and Hartnack, C. (2016). Constraining the nuclear matter equation of state around twice saturation density. *Nuc. Phys. A*, 945:112–133.
- Lee, C.-H., Brown, G. E., Min, D.-P., and Rho, M. (1995). An effective chiral lagrangian approach to kaon-nuclear interactions. Kaonic atom and kaon condensation. *Nuc. Phys. A*, 585(3):401–449.
- Lee, C.-H., Jung, H., Min, D.-P., and Rho, M. (1994). Kaon-nucleon scattering from chiral Lagrangians. *Physics Letters B*, 326(1-2):14–20.
- Levin, Y., Beloborodov, A. M., and Bransgrove, A. (2020). Precessing Flaring Magnetar as a Source of Repeating FRB 180916.J0158+65. *Astro. Phys. J. Lett.*, 895(2):L30.
- Li, B.-A., Cai, B.-J., Xie, W.-J., and Zhang, N.-B. (2021a). Progress in Constraining Nuclear Symmetry Energy Using Neutron Star Observables Since GW170817. *Universe*, 7(6):182.
- Li, B.-A. and Steiner, A. W. (2006). Constraining the radii of neutron stars with terrestrial nuclear laboratory data. *Physics Letters B*, 642(5-6):436–440.
- Li, G. Q., Lee, C. H., and Brown, G. E. (1997). Kaons in dense matter, kaon production in heavy-ion collisions, and kaon condensation in neutron stars. *Nuc. Phys. A*, 625:372–434.
- Li, J. J., Long, W. H., and Sedrakian, A. (2018a). Hypernuclear stars from relativistic Hartree-Fock density functional theory. *European Physical Journal A*, 54(8):133.
- Li, J. J. and Sedrakian, A. (2019). Implications from GW170817 for Δ -isobar Admixed Hypernuclear Compact Stars. *Astro. Phys. J. Lett.*, 874(2):L22.
- Li, J. J., Sedrakian, A., and Alford, M. (2020). Relativistic hybrid stars with sequential first-order phase transitions and heavy-baryon envelopes. *Phys. Rev. D*, 101:063022.
- Li, J. J., Sedrakian, A., and Weber, F. (2018b). Competition between delta isobars and hyperons and properties of compact stars. *Physics Letters B*, 783:234–240.
- Li, J. J., Sedrakian, A., and Weber, F. (2020). Rapidly rotating Δ -resonance-admixed hypernuclear compact stars. *Physics Letters B*, 810:135812.
- Li, Y., Chen, H., Wen, D., and Zhang, J. (2021b). Constraining the nuclear symmetry energy and properties of the neutron star from GW170817 by Bayesian analysis. *European Physical Journal A*, 57(1):31.
- Li, Z. H., Lombardo, U., Schulze, H. J., Zuo, W., Chen, L. W., and Ma, H. R. (2006). Nuclear matter saturation point and symmetry energy with modern nucleon-nucleon potentials. *Phys. Rev. C*, 74(4):047304.
- LIGO Scientific Collaboration, Aasi, J., Abbott, B. P., Abbott, R., Abbott, T., Abernathy, M. R., Ackley, K., et al. (2015). Advanced LIGO. *Classical and Quantum Gravity*, 32(7):074001.
- Link, B., Epstein, R. I., and van Riper, K. A. (1992). Pulsar glitches as probes of neutron star interiors. *Nature*, 359(6396):616–618.

- Logoteta, D. (2019). Consistent nuclear matter calculations with local three-nucleon interactions. *Phys. Rev. C*, 100(4):045803.
- Long, W., Meng, J., Giai, N. V., and Zhou, S.-G. (2004). New effective interactions in relativistic mean field theory with nonlinear terms and density-dependent meson-nucleon coupling. *Phys. Rev. C*, 69(3):034319.
- Lorimer, D. R. and Kramer, M. (2004). *Handbook of Pulsar Astronomy*, volume 4.
- Lutz, M. (1998). Nuclear kaon dynamics. *Physics Letters B*, 426(1-2):12–20.
- Lynch, W. G., Tsang, M. B., Zhang, Y., Danielewicz, P., Famiano, M., Li, Z., and Steiner, A. W. (2009). Probing the symmetry energy with heavy ions. *Progress in Particle and Nuclear Physics*, 62(2):427–432.
- Lyne, A. G., Jordan, C. A., Graham-Smith, F., Espinoza, C. M., Stappers, B. W., and Weltevrede, P. (2015). 45 years of rotation of the Crab pulsar. *Mon. Not. Roy. Astron. Soc.*, 446(1):857–864.
- Malik, T., Alam, N., Fortin, M., Providência, C., Agrawal, B. K., Jha, T. K., Kumar, B., and Patra, S. K. (2018). GW170817: Constraining the nuclear matter equation of state from the neutron star tidal deformability. *Phys. Rev. C*, 98(3):035804.
- Mallick, R. and Schramm, S. (2014). Deformation of a magnetized neutron star. *Phys. Rev. C*, 89(4):045805.
- Margalit, B., Beniamini, P., Sridhar, N., and Metzger, B. D. (2020). Implications of a Fast Radio Burst from a Galactic Magnetar. *Astro. Phys. J. Lett.*, 899(2):L27.
- Maselli, A., Cardoso, V., Ferrari, V., Gualtieri, L., and Pani, P. (2013). Equation-of-state-independent relations in neutron stars. *Phys. Rev. D*, 88(2):023007.
- Matsui, T. (1981). Fermi-liquid properties of nuclear matter in a relativistic mean-field theory. *Nuclear Physics A*, 370(3):365–388.
- Migdal, A. B. (1971). Stability of vacuum and limiting fields. *Zh. Eksp. Teor. Fiz.*, 61:2209–2224.
- Miller, M. C., Lamb, F. K., Dittmann, A. J., Bogdanov, S., Arzoumanian, Z., Gendreau, K. C., et al. (2019). PSR J0030+0451 Mass and Radius from NICER Data and Implications for the Properties of Neutron Star Matter. *Astro. Phys. J. Lett.*, 887(1):L24.
- Miller, M. C., Lamb, F. K., Dittmann, A. J., Bogdanov, S., Arzoumanian, Z., Gendreau, K. C., et al. (2021). The Radius of PSR J0740+6620 from NICER and XMM-Newton Data. *Astro. Phys. J. Lett.*, 918(2):L28.
- Mondal, C., Agrawal, B. K., De, J. N., Samaddar, S. K., Centelles, M., and Viñas, X. (2017). Interdependence of different symmetry energy elements. *Phys. Rev. C*, 96(2):021302.
- Most, E. R., Papenfort, L. J., Weih, L. R., and Rezzolla, L. (2020). A lower bound on the maximum mass if the secondary in GW190814 was once a rapidly spinning neutron star. *Mon. Not. Roy. Astron. Soc.*, 499(1):L82–L86.
- Motta, T. F., Thomas, A. W., and Guichon, P. A. M. (2020). Do Delta baryons play a role in neutron stars? *Physics Letters B*, 802:135266.
- Nakamura, S. X., Sato, T., Lee, T.-S. H., Szczerbinska, B., and Kubodera, K. (2010). Dynamical model of coherent pion production in neutrino-nucleus scattering. *Phys. Rev. C*, 81:035502.
- Nandi, R., Char, P., and Pal, S. (2019). Constraining the relativistic mean-field model equations of state with gravitational wave observations. *Phys. Rev. C*, 99(5):052802.
- Nelson, A. E. and Kaplan, D. B. (1987). Strange condensate realignment in relativistic heavy ion collisions. *Physics Letters B*, 192(1-2):193–197.
- Nikšić, T., Vretenar, D., Finelli, P., and Ring, P. (2002). Relativistic Hartree-Bogoliubov model with density-dependent meson-nucleon couplings. *Phys. Rev. C*, 66(2):024306.
- Oertel, M., Hempel, M., Klähn, T., and Typel, S. (2017). Equations of state for supernovae and compact stars. *Reviews of Modern Physics*, 89(1):015007.

- Oertel, M., Providência, C., Gulminelli, F., and Raduta, A. R. (2015). Hyperons in neutron star matter within relativistic mean-field models. *Journal of Physics G Nuclear Physics*, 42(7):075202.
- Oppenheimer, J. R. and Volkoff, G. M. (1939). On massive neutron cores. *Phys. Rev.*, 55:374–381.
- Page, D., Lattimer, J. M., Prakash, M., and Steiner, A. W. (2009). Neutrino Emission from Cooper Pairs and Minimal Cooling of Neutron Stars. *Astro. Phys. J.*, 707(2):1131–1140.
- Page, D. and Reddy, S. (2006). Dense Matter in Compact Stars: Theoretical Developments and Observational Constraints. *Annual Review of Nuclear and Particle Science*, 56(1):327–374.
- Pal, S., Bandyopadhyay, D., and Greiner, W. (2000a). Antikaon condensation in neutron stars. *Nuc. Phys. A*, 674(3-4):553–577.
- Pal, S., Ko, C. M., Lin, Z., and Zhang, B. (2000b). Antiflow of kaons in relativistic heavy ion collisions. *Phys. Rev. C*, 62(6):061903.
- Pang, P. T. H., Tews, I., Coughlin, M. W., Bulla, M., Van Den Broeck, C., and Dietrich, T. (2021). Nuclear Physics Multimessenger Astrophysics Constraints on the Neutron Star Equation of State: Adding NICER’s PSR J0740+6620 Measurement. *Astro. Phys. J.*, 922(1):14.
- Pons, J. A., Miralles, J. A., and Geppert, U. (2009). Magneto-thermal evolution of neutron stars. *Astronomy & Astrophysics*, 496(1):207–216.
- Pons, J. A. and Viganò, D. (2019). Magnetic, thermal and rotational evolution of isolated neutron stars. *Living Reviews in Computational Astrophysics*, 5(1):3.
- Prakash, M., Bombaci, I., Prakash, M., Ellis, P. J., Lattimer, J. M., and Knorren, R. (1997). Composition and structure of protoneutron stars. *Phys. Rep.*, 280:1–77.
- Providência, C. and Rabhi, A. (2013). Interplay between the symmetry energy and the strangeness content of neutron stars. *Phys. Rev. C*, 87(5):055801.
- Raaijmakers, G., Greif, S. K., Hebeler, K., Hinderer, T., Nisanke, S., Schwenk, A., Riley, T. E., Watts, A. L., Lattimer, J. M., and Ho, W. C. G. (2021). Constraints on the Dense Matter Equation of State and Neutron Star Properties from NICER’s Mass-Radius Estimate of PSR J0740+6620 and Multimessenger Observations. *Astro. Phys. J. Lett.*, 918(2):L29.
- Rabhi, A., Providência, C., and Da Providência, J. (2008). Stellar matter with a strong magnetic field within density-dependent relativistic models. *Journal of Physics G Nuclear Physics*, 35(12):125201.
- Radhakrishnan, V. and Manchester, R. N. (1969). Detection of a Change of State in the Pulsar PSR 0833-45. *Nature*, 222(5190):228–229.
- Radice, D., Perego, A., Zappa, F., and Bernuzzi, S. (2018). GW170817: Joint Constraint on the Neutron Star Equation of State from Multimessenger Observations. *Astro. Phys. J. Lett.*, 852(2):L29.
- Raduta, A. R. (2021). Δ -admixed neutron stars: Spinodal instabilities and dUrca processes. *Physics Letters B*, 814:136070.
- Raithel, C. A., Özel, F., and Psaltis, D. (2018). Tidal Deformability from GW170817 as a Direct Probe of the Neutron Star Radius. *Astro. Phys. J. Lett.*, 857(2):L23.
- Ramos, A. and Oset, E. (2000). The properties of \bar{K} in the nuclear medium. *Nuc. Phys. A*, 671(1):481–502.
- Rarita, W. and Schwinger, J. (1941). On a theory of particles with half-integral spin. *Phys. Rev.*, 60:61–61.
- Rashdan, M. (2001). Structure of exotic nuclei and superheavy elements in a relativistic shell model. *Phys. Rev. C*, 63:044303.
- Rather, I. A., Rahaman, U., Imran, M., Das, H. C., Usmani, A. A., and Patra, S. K. (2021). Rotating neutron stars with quark cores. *Phys. Rev. C*, 103(5):055814.
- Ravenhall, D. G., Pethick, C. J., and Wilson, J. R. (1983). Structure of matter below nuclear

- saturation density. *Phys. Rev. Lett.*, 50:2066–2069.
- Reed, B. T., Fattoyev, F. J., Horowitz, C. J., and Piekarewicz, J. (2021). Implications of PREX-2 on the Equation of State of Neutron-Rich Matter. *Phys. Rev. Lett.*, 126(17):172503.
- Ribes, P., Ramos, A., Tolos, L., Gonzalez-Boquera, C., and Centelles, M. (2019). Interplay between Delta Particles and Hyperons in Neutron Stars. *Astro. Phys. J.*, 883(2):168.
- Riley, T. E., Watts, A. L., Bogdanov, S., Ray, P. S., Ludlam, R. M., Guillot, S., et al. (2019). A NICER View of PSR J0030+0451: Millisecond Pulsar Parameter Estimation. *Astro. Phys. J. Lett.*, 887(1):L21.
- Riley, T. E., Watts, A. L., Ray, P. S., Bogdanov, S., Guillot, S., Morsink, S. M., et al. (2021). A NICER View of the Massive Pulsar PSR J0740+6620 Informed by Radio Timing and XMM-Newton Spectroscopy. *Astro. Phys. J. Lett.*, 918(2):L27.
- Roca-Maza, X., Viñas, X., Centelles, M., Agrawal, B. K., Colò, G., Paar, N., Piekarewicz, J., and Vretenar, D. (2015). Neutron skin thickness from the measured electric dipole polarizability in $^{68}\text{Ni}^{120}\text{Sn}$ and ^{208}Pb . *Phys. Rev. C*, 92(6):064304.
- Romani, R. W., Kandel, D., Filippenko, A. V., Brink, T. G., and Zheng, W. (2021). PSR J1810+1744: Companion Darkening and a Precise High Neutron Star Mass. *Astro. Phys. J. Lett.*, 908(2):L46.
- Romani, R. W., Kandel, D., Filippenko, A. V., Brink, T. G., and Zheng, W. (2022). PSR J0952-0607: The Fastest and Heaviest Known Galactic Neutron Star. *Astro. Phys. J. Lett.*, 934(2):L18.
- Russotto, P., Gannon, S., Kupny, S., Lasko, P., Acosta, L., Adamczyk, M., et al. (2016). Results of the asy-eos experiment at gsi: The symmetry energy at suprasaturation density. *Phys. Rev. C*, 94:034608.
- Sahoo, H. S., Mitra, G., Mishra, R., Panda, P. K., and Li, B.-A. (2018). Neutron star matter with Δ isobars in a relativistic quark model. *Phys. Rev. C*, 98(4):045801.
- Salpeter, E. E. (1960). Matter at high densities. *Annals of Physics*, 11(4):393–413.
- Sammarruca, F. (2009). Effect of Λ hyperons on the nuclear equation of state in a Dirac-Brueckner-Hartree-Fock model. *Phys. Rev. C*, 79(3):034301.
- Sawyer, R. F. (1972). Condensed π^- phase in neutron-star matter. *Phys. Rev. Lett.*, 29:382–385.
- Schaffner, J., Dover, C., Gal, A., Greiner, C., Millener, D., and Stocker, H. (1994). Multiply strange nuclear systems. *Annals of Physics*, 235(1):35–76.
- Schaffner, J. and Mishustin, I. N. (1996). Hyperon-rich matter in neutron stars. *Phys. Rev. C*, 53(3):1416–1429.
- Schaffner-Bielich, J., Koch, V., and Effenberger, M. (2000). Medium modified cross sections, temperature and finite momentum effects for antikaon production in heavy-ion collisions. *Nuc. Phys. A*, 669(1-2):153–172.
- Schulze, H. J., Lejeune, A., Cugnon, J., Baldo, M., and Lombardo, U. (1995). Hypernuclear matter in the Brueckner-Hartree-Fock approximation. *Physics Letters B*, 355(1):21–26.
- Schürhoff, T., Schramm, S., and Dexheimer, V. (2010). Neutron Stars with Small Radii—The Role of Δ Resonances. *Astro. Phys. J. Lett.*, 724(1):L74–L77.
- Sedrakian, A. (2016). Rapid rotational crust-core relaxation in magnetars. *Astronomy & Astrophysics*, 587:L2.
- Sedrakian, A. and Clark, J. W. (2019). Superfluidity in nuclear systems and neutron stars. *European Physical Journal A*, 55(9):167.
- Sedrakian, A., Weber, F., and Li, J. J. (2020). Confronting GW190814 with hyperonization in dense matter and hypernuclear compact stars. *Phys. Rev. D*, 102(4):041301.
- Sedrakian, A., Xu-Guang, H., Sinha, M., and Clark, J. W. (2017). From microphysics to dynamics of magnetars. In *Journal of Physics Conference Series*, volume 861 of *Journal of*

- Physics Conference Series*, page 012025.
- Servillat, M., Heinke, C. O., Ho, W. C. G., Grindlay, J. E., Hong, J., van den Berg, M., and Bogdanov, S. (2012). Neutron star atmosphere composition: the quiescent, low-mass X-ray binary in the globular cluster M28. *Mon. Not. Roy. Astron. Soc.*, 423(2):1556–1561.
- Shahrbaf, M., Blaschke, D., Grunfeld, A. G., and Moshfegh, H. R. (2020). First-order phase transition from hypernuclear matter to deconfined quark matter obeying new constraints from compact star observations. *Phys. Rev. C*, 101(2):025807.
- Shapiro, S. L. and Teukolsky, S. A. (1983). *Black holes, white dwarfs, and neutron stars : the physics of compact objects*.
- Sharma, B. K. and Pal, S. (2009). Nuclear symmetry energy effects in finite nuclei and neutron star. *Physics Letters B*, 682(1):23–26.
- Sharma, M. M., Nagarajan, M. A., and Ring, P. (1993). Rho meson coupling in the relativistic mean field theory and description of exotic nuclei. *Physics Letters B*, 312(4):377–381.
- Shen, H., Toki, H., Oyamatsu, K., and Sumiyoshi, K. (1998). Relativistic equation of state of nuclear matter for supernova and neutron star. *Nuc. Phys. A*, 637(3):435–450.
- Sinha, M., Mukhopadhyay, B., and Sedrakian, A. (2013). Hypernuclear matter in strong magnetic field. *Nuc. Phys. A*, 898:43–58.
- Sinha, M. and Sedrakian, A. (2015). Magnetar superconductivity versus magnetism: Neutrino cooling processes. *Phys. Rev. C*, 91(3):035805.
- Sinha, M. and Sedrakian, A. (2015). Upper critical field and (non)-superconductivity of magnetars. *Phys. Part. Nucl.*, 46(5):826–829.
- Somasundaram, R. and Margueron, J. (2021). Impact of massive neutron star radii on the nature of phase transitions in dense matter. *arXiv e-prints*, page arXiv:2104.13612.
- Spinella, W. M. (2017). *A Systematic Investigation of Exotic Matter in Neutron Stars*. PhD thesis, The Claremont Graduate University.
- Stein, M., Sedrakian, A., Huang, X.-G., and Clark, J. W. (2016). Spin-polarized neutron matter: Critical unpairing and BCS-BEC precursor. *Phys. Rev. C*, 93(1):015802.
- Steiner, A. W., Heinke, C. O., Bogdanov, S., Li, C. K., Ho, W. C. G., Bahramian, A., and Han, S. (2018). Constraining the mass and radius of neutron stars in globular clusters. *Mon. Not. Roy. Astron. Soc.*, 476(1):421–435.
- Steiner, A. W., Lattimer, J. M., and Brown, E. F. (2013). The Neutron Star Mass-Radius Relation and the Equation of State of Dense Matter. *Astro. Phys. J. Lett.*, 765(1):L5.
- Sun, B. Y., Long, W. H., Meng, J., and Lombardo, U. (2008). Neutron star properties in density-dependent relativistic Hartree-Fock theory. *Phys. Rev. C*, 78(6):065805.
- Taninah, A., Agbemava, S. E., Afanasjev, A. V., and Ring, P. (2020). Parametric correlations in energy density functionals. *Physics Letters B*, 800:135065.
- Tews, I., Lattimer, J. M., Ohnishi, A., and Kolomeitsev, E. E. (2017). Symmetry Parameter Constraints from a Lower Bound on Neutron-matter Energy. *Astro. Phys. J.*, 848(2):105.
- Tews, I., Margueron, J., and Reddy, S. (2018). Critical examination of constraints on the equation of state of dense matter obtained from GW170817. *Phys. Rev. C*, 98(4):045804.
- Tews, I., Pang, P. T. H., Dietrich, T., Coughlin, M. W., Antier, S., Bulla, M., Heinzl, J., and Issa, L. (2021). On the Nature of GW190814 and Its Impact on the Understanding of Supranuclear Matter. *Astro. Phys. J. Lett.*, 908(1):L1.
- Thapa, V. B., Kumar, A., and Sinha, M. (2021). Baryonic dense matter in view of gravitational-wave observations. *Mon. Not. Roy. Astron. Soc.*, 507(2):2991–3004.
- Thapa, V. B. and Sinha, M. (2020). Dense matter equation of state of a massive neutron star with antikaon condensation. *Phys. Rev. D*, 102(12):123007.
- Thapa, V. B. and Sinha, M. (2022). Influence of the nuclear symmetry energy slope on observables of compact stars with Δ -admixed hypernuclear matter. *Phys. Rev. C*, 105:015802.

- Thapa, V. B., Sinha, M., Li, J. J., and Sedrakian, A. (2020). Equation of State of Strongly Magnetized Matter with Hyperons and Δ -Resonances. *Particles*, 3(4):660–675.
- Thapa, V. B., Sinha, M., Li, J. J., and Sedrakian, A. (2021). Massive Δ -resonance admixed hypernuclear stars with antikaon condensations. *Phys. Rev. D*, 103:063004.
- Thapa, V. B., Sinha, M., Li, J. J., and Sedrakian, A. (2022). Dense matter in strong magnetic field: covariant density functional approach. (in press). *Springer Proceedings in Physics*.
- Tolman, R. C. (1939). Static solutions of einstein’s field equations for spheres of fluid. *Phys. Rev.*, 55:364–373.
- Tolos, L., Centelles, M., and Ramos, A. (2017). The Equation of State for the Nucleonic and Hyperonic Core of Neutron Stars. *Publications of the Astronomical Society of Australia*, 34:e065.
- Tolos, L. and Fabbietti, L. (2020). Strangeness in nuclei and neutron stars. *Progress in Particle and Nuclear Physics*, 112:103770.
- Tsang, M. B., Chajecki, Z., Coupland, D., Danielewicz, P., Famiano, F., Hodges, R., Kilburn, M., Lu, F., Lynch, W. G., Winkelbauer, J., Youngs, M., and Zhang, Y. X. (2011). Constraints on the density dependence of the symmetry energy from heavy-ion collisions. *Progress in Particle and Nuclear Physics*, 66(2):400–404.
- Tsang, M. B., Zhang, Y., Danielewicz, P., Famiano, M., Li, Z., Lynch, W. G., and Steiner, A. W. (2009). Constraints on the Density Dependence of the Symmetry Energy. *Phys. Rev. Lett.*, 102(12):122701.
- Tsuruta, S. and Cameron, A. G. W. (1966). Some effects of nuclear forces on neutron-star models. *Can. J. Phys.*, 44:1895–1922.
- Turolla, R., Zane, S., and Watts, A. L. (2015). Magnetars: the physics behind observations. A review. *Reports on Progress in Physics*, 78(11):116901.
- Typel, S. (2005). Relativistic model for nuclear matter and atomic nuclei with momentum-dependent self-energies. *Phys. Rev. C*, 71(6):064301.
- Typel, S. and Alvear Terrero, D. (2020). Parametrisations of relativistic energy density functionals with tensor couplings. *European Physical Journal A*, 56(6):160.
- Typel, S., Röpke, G., Klähn, T., Blaschke, D., and Wolter, H. H. (2010). Composition and thermodynamics of nuclear matter with light clusters. *Phys. Rev. C*, 81(1):015803.
- Typel, S. and Wolter, H. (1999). Relativistic mean field calculations with density-dependent meson-nucleon coupling. *Nuclear Physics A*, 656(3):331–364.
- van Dalen, E. N. E., Colucci, G., and Sedrakian, A. (2014). Constraining hypernuclear density functional with Λ -hypernuclei and compact stars. *Physics Letters B*, 734:383–387.
- Vautherin, D. and Brink, D. M. (1972). Hartree-Fock Calculations with Skyrme’s Interaction. I. Spherical Nuclei. *Phys. Rev. C*, 5(3):626–647.
- Vidaña, I., Polls, A., Ramos, A., Hjorth-Jensen, M., and Stoks, V. G. J. (2000). Strange nuclear matter within Brueckner-Hartree-Fock theory. *Phys. Rev. C*, 61(2):025802.
- Waas, T. and Weise, W. (1997). S-wave interactions of \bar{K} and η mesons in nuclear matter. *Nuc. Phys. A*, 625(1):287–306.
- Wagoner, R. V. (1975). Test for the existence of gravitational radiation. *Astro. Phys. J.*, 196:L63–L65.
- Walecka, J. D. (1974). A theory of highly condensed matter. *Annals of Physics*, 83:491–529.
- Wallace, M., Famiano, M., van Goethem, M.-J., Rogers, A., Lynch, W., Clifford, J., et al. (2007). The high resolution array (hira) for rare isotope beam experiments. *Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment*, 583(2):302–312.
- Watson, D., Hansen, C. J., Selsing, J., Koch, A., Malesani, D. B., Andersen, A. C., Fynbo, J. P. U., Arcones, A., Bauswein, A., Covino, S., Grado, A., Heintz, K. E., Hunt, L., Kouveliotou,

- C., Leloudas, G., Levan, A. J., Mazzali, P., and Pian, E. (2019). Identification of strontium in the merger of two neutron stars. *Nature*, 574(7779):497–500.
- Weber, F. and Weigel, M. (1989). Baryon composition and macroscopic properties of neutron stars. *Nuclear Physics A*, 505(3):779–822.
- Wehrberger, K., Bedau, C., and Beck, F. (1989). Electromagnetic excitation of the delta-baryon in quantum hadrodynamics. *Nuclear Physics A*, 504(4):797–817.
- Weissenborn, S., Chatterjee, D., and Schaffner-Bielich, J. (2012). Hyperons and massive neutron stars: The role of hyperon potentials. *Nuc. Phys. A*, 881:62–77.
- Witten, E. (1984). Cosmic separation of phases. *Phys. Rev. D*, 30:272–285.
- Woodsley, S. and Janka, T. (2005). The physics of core-collapse supernovae. *Nature Physics*, 1(3):147–154.
- Wu, X., Bao, S., Shen, H., and Xu, R. (2021). Effect of the symmetry energy on the secondary component of GW190814 as a neutron star. *Phys. Rev. C*, 104(1):015802.
- Xu, Y., Ding, W. B., Liu, C. Z., and Han, J. L. (2020). Nucleonic Direct Urca Processes and Cooling of the Massive Neutron Star by Antikaon Condensations. *Advances in Astronomy*, 2020:6146913.
- Xu, Y., Huang, X. L., Zhang, X. J., Yu, Z., Fan, C. B., Ding, W. B., and Liu, C. Z. (2018). The influence of antikaon condensations on nucleon 1S_0 superfluidity in neutron star matter. *Mon. Not. Roy. Astron. Soc.*, 474(3):3576–3581.
- Yakovlev, D. G. and Pethick, C. J. (2004). Neutron Star Cooling. *Ann. Rev. Astron. Astrophys.*, 42(1):169–210.
- Yamamoto, Y., Furumoto, T., Yasutake, N., and Rijken, T. A. (2016). Hyperon-mixed neutron star with universal many-body repulsion. *European Physical Journal A*, 52:19.
- Yu, M., Manchester, R. N., Hobbs, G., Johnston, S., Kaspi, V. M., Keith, M., Lyne, A. G., Qiao, G. J., Ravi, V., Sarkissian, J. M., Shannon, R., and Xu, R. X. (2013). Detection of 107 glitches in 36 southern pulsars. *Mon. Not. Roy. Astron. Soc.*, 429(1):688–724.
- Zanazzi, J. J. and Lai, D. (2020). Periodic Fast Radio Bursts with Neutron Star Free Precession. *Astro. Phys. J. Lett.*, 892(1):L15.
- Zhang, N.-B. and Li, B.-A. (2021). Impact of NICER’s Radius Measurement of PSR J0740+6620 on Nuclear Symmetry Energy at Suprasaturation Densities. *Astro. Phys. J.*, 921(2):111.
- Zhou, X.-R., Polls, A., Schulze, H. J., and Vidaña, I. (2008). Λ hyperons and the neutron drip line. *Phys. Rev. C*, 78(5):054306.
- Zhu, Z.-Y., Li, A., Hu, J.-N., and Sagawa, H. (2016). $\Delta(1232)$ effects in density-dependent relativistic hartree-fock theory and neutron stars. *Phys. Rev. C*, 94:045803.
- Zimmerman, J., Carson, Z., Schumacher, K., Steiner, A. W., and Yagi, K. (2020). Measuring Nuclear Matter Parameters with NICER and LIGO/Virgo. *arXiv e-prints*, page arXiv:2002.03210.