## Department of Physics

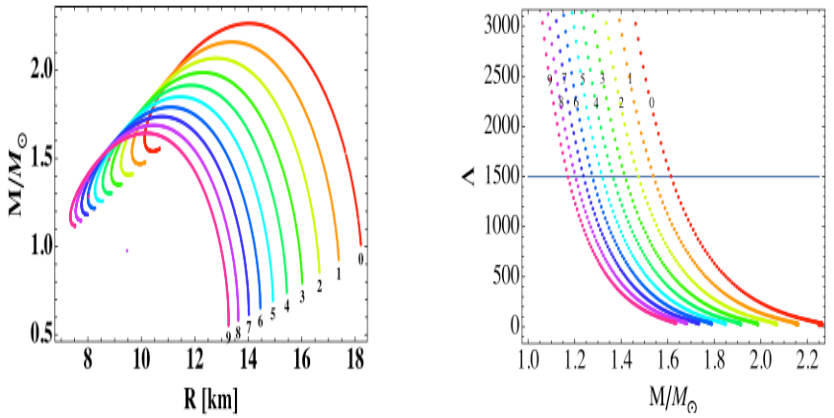
# Neutron Stars from Holographic QCD

I am a theoretical physicist and have been worked on various topics on string theory, black hole physics, holographic principle and quantum information sciences. In recent years and near future I mainly work on the gravitational wave astronomy by analyzing the gravitational wave observational data from LIGO/Virgo/KAGRA collaborations, and study their theoretical implications to black hole physics, dark matter, cosmology and astrophysics. We also develop the machine learning tools for the next generations of gravitational wave data analysis such as LISA and Einstein telescope.
Our webpage: https://taipeigravitationalwavegroup.weebly.com

**Techniques used in study**
Quantum Field Theory; General Relativity
Machine Learning for gravitational wave data analysis

We derive the following equation of state for nuclear matter from holographic quantum chromodynamics (QCD) and use it to yield neutron star configurations as shown by mass-radius relation and tidal Lover number.

$$\epsilon/\epsilon_\odot = 2.629\mathcal{A}^{-0.192}(p/p_\odot)^{1.192} + 0.131\mathcal{A}^{0.544}(p/p_\odot)^{0.456}$$

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Ministry of Science and Technology
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**Publications**


- Compact Star of Holographic Nuclear Matter and GW170817, K. Zhang, T. Hirayama, L.-W. Luo and F.-L. Lin*. Physic Letter B 801, 135176 (2020).
- Distinguishing Black Hole Microstates using Holevo Information, W.-Z. Guo, F.-L. Lin* and Jiaju Zhang*. Physical Review Letters 121, 251603 (2018).
- Satellite testing of a gravitationally induced quantum decoherence model, P. Xu, Y. Ma, J.-G. Ren, H.-L. Yong, T. C. Ralph, S.-K. Liao, J. Yin, W.-Y. Liu, W.-Q. Cai, X. Han, H.-N. Wu, W.-Y. Wang, F.-Z. Li, M. Yang, F.-L. Lin, L. Li, N.-L. Liu, Y.-A. Chen, C.-Y. Lu, Y. Chen, J. Fan*, C.-Z. Peng* and J.-W. Pan*. Science 366, 132 (2019).