

Prof Shuang-Yong Zhou

Effective field theory, Gravity, Cosmology and Particle Physics

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Curriculum Vitae

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| 2012 | PhD, University of Nottingham, UK |
| 2012--2014 | Postdoctoral Research Fellow, SISSA, Italy |
| 2014--2016 | Postdoctoral Scholar, Case Western Reserve University, USA |
| 2016--2017 | Research Associate, Imperial College London, UK |
| 2017-- | Professor, University of Science and Technology of China |

Research

My research lies at the intersection of quantum field theory, gravity and particle physics. Currently, I am interested in extracting positivity bounds in effective field theories from fundamental S-matrix principles and utilizing the positivity bounds to constrain particle physics and gravitational models such as the standard model effective field theory (SMEFT), massive gravity, etc. I am also interested in non-topological solitons in field theories and their roles in the early universe, as well as testing General Relativity in the strong gravity regimes such as near black holes with gravitational waves and numerical relativity. (See [my research profile from inSPIRE-HEP](#))

Current Research Interests

- Effective field theories and positivity bounds (S-matrix bootstrap)
- Non-topological solitons and gravitational waves from the early universe
- Massive gravity, strong gravity and black holes

Selected Recent Publications

- Snowmass White Paper: UV Constraints on IR Physics, Claudia de Rham, Sandipan Kundu, Matthew Reece, Andrew J. Tolley, SYZ, arXiv: 2203.06805 [hep-th].
- Triple crossing positivity bounds for multi-field theories, Zong-Zhe Du, Cen Zhang, SYZ, JHEP 12 (2021) 115; arXiv: 2111.01169 [hep-th].
- Positivity in Multifield Effective Field Theories, Xu Li, Hao Xu, Chengjie Yang, Cen Zhang, SYZ, Phys.Rev.Lett. 127 (2021) 12, 121601; arXiv: 2101.01191 [hep-ph].
- Gravitational collapse of quantum fields and Choptuik scaling, Benjamin Berczi, Paul M. Saffin, SYZ, JHEP 02 (2022) 183; arXiv: 2111.11400 [hep-th].
- New positivity bounds from full crossing symmetry, Andrew J. Tolley, Zi-Yue Wang, SYZ, JHEP 05 (2021) 255; arXiv: 2011.02400 [hep-th].
- A convex geometry perspective to the (SM)EFT space, Cen Zhang, SYZ, Phys.Rev.Lett. 125 (2020) 20, 201601; arXiv: 2005.03047 [hep-ph].
- Oscillon Preheating in Full General Relativity, Xiao-Xiao Kou, Chi Tian, SYZ, Class.Quant. Grav. 38 (2021) 4, 045005; arXiv: 1912.09658 [gr-qc].
- Positivity bounds on vector boson scattering at the LHC, Cen Zhang, SYZ, Phys.Rev.D100 (2019) 095003; arXiv: 1808.00010 [hep-ph].
- Can the graviton have a large mass near black holes? Jun Zhang, SYZ, Phys.Rev.D97 (2018) 081501(Rapid Communication); arXiv: 1709.07503 [gr-qc].
- UV complete me: Positivity Bounds for Particles with Spin, Claudia de Rham, Scott Melville, Andrew J. Tolley, SYZ, JHEP 1803 (2018) 011; arXiv: 1706.02712 [hep-th].
- Graviton Mass Bounds, Claudia de Rham, J. Tate Deskins, Andrew J. Tolley, SYZ, Rev.Mod.Phys. 89 (2017), 025004 (*Review Article*); arXiv: 1606.08462 [astro-ph.CO].
- The Λ_2 limit of massive gravity, Claudia de Rham, Andrew J. Tolley, SYZ, JHEP 1604 (2016) 188; arXiv: 1602.03721 [hep-th].
- Charge-Swapping Q-balls, Edmund J. Copeland, Paul M. Saffin, SYZ, Phys.Rev.Lett. 113 (2014), 231603 (*Editors' Suggestion*); arXiv: 1409.3232 [hep-th].
- Black hole hair in generalized scalar-tensor gravity, Thomas P. Sotiriou, SYZ, Phys.Rev.Lett. 112 (2014) 251102, arXiv: 1312.3622 [gr-qc].
- Mass-Varying Massive Gravity, Qing-Guo Huang, Yun-Song Piao, SYZ, Phys.Rev. D86 (2012) 124014; arXiv: 1206.5678 [hep-th].

(See [the full list of publications from inSPIRE-HEP](#))