2024 Summer School on Cosmology and Particle Physics

Monday, 22 July 2024 - Friday, 26 July 2024

CTPU PTC

Scientific Programme

□□□ : Introduction to cosmology
□□:
1. Preliminaries – General Relativity, Observed Universe
2. Expanding Universe
3. Thermal History
4. Inhomogeneity
5. At the beginning – Dark matter, Dark Energy, Inflation
□□□□:
1. Scott Dodelson, <Modern Cosmology>, Academic Press (2003)
2. Steven Weinberg, <Cosmology>, Oxford (2008)
3. □□□, <□□, □□□□ □□>, □□□ (2017)

□□□: : Solitons in field theory
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1. Introduction to solitons
2. Domain walls
3. Vortices
4. Monopoles
5. Instantons
□□□□:
Rajaraman, Solitons and Instantons, North Holland (1987)
Manton and Sutcliffe, Topological Solitons, Cambridge (2004)
Weinberg, Classical Solutions in Quantum Field Theory (2012)
Shifman and Yung, Supersymmetric Solitons (2023)
Tong, TASI Lectures on Solitons, hep-th/059216

□□□: Higgs Bosons in Collider
□□:
1. Gauge symmetry [1, 2] 1
2. SM Higgs boson [1–3] 1
3. Higgs bosons in two-Higgs-doublet models [4] 1
4. Higgs decays [5] 1
5. Higgs precision [6, 7] 1
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[1] M. E. Peskin and D. V. Schroeder, “An Introduction to quantum field theory,” Addison-Wesley, 1995, ISBN 978-0-201-
50397-5, 978-0-429-50355-9, 978-0-429-49417-8 doi:10.1201/9780429503559
[2] M. D. Schwartz, “Quantum Field Theory and the Standard Model,” Cambridge University Press, 2014, ISBN 978-1-107-
03473-0, 978-1-107-03473-0
[3] H. E. Logan, “TASI 2013 lectures on Higgs physics within and beyond the Standard Model,” [arXiv:1406.1786 [hep-ph]].
[4] J. S. Lee and J. Park, “Yukawa alignment revisited in the Higgs basis,” Phys. Rev. D 106, no.1, 015023 (2022)
doi:10.1103/PhysRevD.106.015023 [arXiv:2110.03908 [hep-ph]].
[5] S. Y. Choi, J. S. Lee and J. Park, “Decays of Higgs bosons in the Standard Model and beyond,” Prog. Part. Nucl. Phys.
120, 103880 (2021) doi:10.1016/j.ppnp.2021.103880 [arXiv:2101.12435 [hep-ph]].
[6] M. Spira, “Higgs Boson Production and Decay at Hadron Colliders,” Prog. Part. Nucl. Phys. 95, 98-159 (2017)
doi:10.1016/j.ppnp.2017.04.001 [arXiv:1612.07651 [hep-ph]].
[7] Y. Heo, D. W. Jung and J. S. Lee, “Higgs Precision Analysis of the Full LHC Run 1 and Run 2 Data,” [arXiv:2402.02822
[hep-ph]].