2022 Summer School on Cosmology and Particle Physics

Sunday, 24 July 2022 - Friday, 29 July 2022

CTPU PTC

Scientific Programme

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Quantum Fields and Particles
Gauge Principle
QED
Yang-Mills Theory : QCD and Weak Interaction
Standard Model : Higgs mechanism, gauge bosons, quarks and leptons

References :
1. Textbooks
Halzen and Martin, “Quarks and Leptons”
Griffiths, “Introduction t Elementary Particles”
□□□, “ LHC, □□□□□□ □□□”
2. Lecture notes and other materials
Prof. D. Tong :
https://www.damtp.cam.ac.uk/user/tong/particle.html
Prof. H. Osborn :
https://www.damtp.cam.ac.uk/user/ho/

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Inflation
linear perturbation theory
generation of seed perturbation during inflation
growth of linear perturbation
CMB temperature and polarization anisotropies

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Relaxion physics
The weak scale hierarchy problem : conventional solutions vs relaxion solution
Relaxion model building I : cosmological evolution, QCD relaxion, non-QCD relaxion
Relaxion model building II : clockwork mechanism
Phenomenology of relaxion : Higgs-relaxion mixing

Black Hole: Pablo Soler (IBS-CTPU)
Introduction to Black Holes and their Quantum aspects
Quantum fields on curved spacetimes
Classical Schwarzschild Black Holes
Quantum fields on Schwarzschild BHs
Charged (Reissner-Nordstrom) BHs

Useful references will be:

Birrell & Davies: "Quantum Fields in Curved Space”
Mukhanov & Winitzki: "Introduction to Quantum Effects in Gravity”