

LONDON INSTITUTE OF COSMOLOGY

KCL research topics

- Astroparticle Cosmology
 - Constraints on axions and millicharged particles (*MF, JE*)
 - Cosmological constraints on BSM particles (*BA, MF, JE, NM*)
 - Astro-Cosmology Tests of Lorentz Invariance (*JE, NM*)
- Baryogenesis/Nucleosynthesis
 - Use BBN constraints to test cosmological models (*MS*)
 - Effect of varying constants on primordial abundances (*MF*)
 - Leptogenesis/Baryogenesis (*MF, NM, SS*)
 - Non-thermal Dark Matter and Baryogenesis (*BA*)
- Cosmological Inflation
 - Higgs Inflation (*MF, MS*)
 - Alternatives to scalar field inflation (*NM, MS*)
 - String Theory models of inflation (*BA, MS, MF*)
 - Particle Physics models of inflation (*MS, MF, JE*)
 - Multifield inflation/curvatons (*MF, MS*)
- CMB, Large Scale Structure, Lensing
 - Vector fields in the CMB (*JA, EL, NM, MS*)
 - Primordial Non-Gaussianities (*EL, MS, MF*)
 - CMB polarization and 2nd order CMB effects (*EL*)
- Dark Energy and Modified Gravity
 - Model building (*NM, MS, SS*)
 - Modified Gravity (*JA, EL, MF*)
 - Use of data to constrain DE models (*MF*)
- Dark Matter
 - Astroparticle candidates (*JE, MF, NM*)
 - SUSY Dark Matter (*BA, JE, MF*)

- Dark Matter in String/M theory (*BA*)
 - Direct detection (*BA, MF, JE*)
 - Indirect detection (*BA, MF, JE*)
 - Dark matter and Galactic dynamics (*MF, MS*)
 - Dark matter interacting with stars (*MF*)
 - Tests of alternative to the DM theories especially strong and weak lensing (*NM, MS, SS*)
 - Lorentz-violating Dark Matter and astrophysical/cosmological tests using intense astrophysical sources, such as AGN, GRB (*EL, JA, NM*)
- Gravity and Gravitational Waves
 - GW signals from cosmological sources (*MS, EL*)
 - Gravitational back-reaction (*EL, MS*)
 - GW propagation in models beyond GR (*MS*)
 - Numerical GR in Cosmology (*EL*)
- Neutrino Astrophysics
 - Gravitationally induced Leptogenesis and Neutrinos (*NM, SS*)
 - Searching for sterile Neutrinos in the Universe (*NM*)
- Topological Defects
 - Cosmic strings & Cosmic superstrings (*MS, EL*)
 - Theory of High-gamma soliton interactions (*EL*)
 - String theory defects (D-matter) (*NM, MS, SS*)
 - Astrophysical and Cosmological Searches for Defects in the Universe (*NM, MS*)

KCL GROUP COLLABORATIONS

■ Members of the TPPC-KCL group have several national collaborations.

In particular, in the London area:

- COSMOS Consortium
- IC
- London Center for TeraUniverse Studies
- UCL -- including Mullard Labs

■ Members of the TPPC-KCL group have also many international collaborations, which are of national interest and involve aspects of the previously mentioned research interests.

International Centres:

- CERN

International Science Programmes/Experiments:

- EUCLID (ESA) Consortium
- MoEdal
- VIRGO-EGO Scientific Forum