SEPTA meeting at Sussex (8 December 2021)

Report of Contributions

https://indico.cern.ch/e/1101999

Contribution ID: **1** Type: **not specified**

Consortium meeting (faculty only)

Wednesday 8 December 2021 12:00 (1 hour)

https://universityofsussex.zoom.us/j/92451118818

Contribution ID: **2** Type: **not specified**

Primordial black holes in a nutshell

Wednesday 8 December 2021 16:45 (25 minutes)

Although black holes can be the remnants of dead stars, it is also possible that some are primordial. Such primordial black holes are the unique dark matter candidate which is not a new type of particle, and they could also explain some of the unexpected properties of the black hole mergers that LIGO and Virgo have detected. I will summarise the evidence and (fine-tuning) challenges behind this claim. There is interesting coincidence of scales between the LIGO-Virgo events, the Chandrasekhar limit and the horizon mass during the QCD transition in the early universe, and the wavelength of gravitational waves on which NANOGrav may (potentially) have detected a stochastic gravitational wave background.

Presenter: BYRNES, Christian (University of Sussex (GB))

Session Classification: Second session of talks

Contribution ID: **3** Type: **not specified**

Top quark mass corrections to NNLO double Higgs boson production

Wednesday 8 December 2021 14:00 (25 minutes)

Presenter: DAVIES, Joshua

Session Classification: First session of talks

Contribution ID: **4** Type: **not specified**

The graviton spectral function

Wednesday 8 December 2021 14:30 (25 minutes)

Over the past decades, the asymptotic safety scenario has matured into a viable contender for a consistent theory of quantum gravity. However, the pressing question of unitarity is far from being settled. I will present important steps towards tackling this issue and show the first computation of the graviton spectral function in asymptotically safe quantum gravity. We find a positive graviton spectral function, showing a massless one-graviton peak and a multi-graviton continuum with an asymptotically safe scaling for large spectral values. For small spectral values, the correct effective field theory result is reproduced. I will indicate consequences for scattering amplitudes and unitarity.

Presenter: REICHERT, Manuel (University of Sussex)

Session Classification: First session of talks

Contribution ID: **5** Type: **not specified**

Discussion

Wednesday 8 December 2021 17:15 (45 minutes)

Contribution ID: **6** Type: **not specified**

Searching for exotic physics in Tritium decay

Wednesday 8 December 2021 16:00 (20 minutes)

Tritium Beta Decay is the least model dependent method for measuring the masses of neutrinos. It also provides a probe for Beyond the Standard Model effects such as sterile neutrinos and right-handed currents. This talk will give an overview of the expected standard model result and potential probes for these BSM effects.

Presenter: CANNING, James (UCL)

Session Classification: Second session of talks

Contribution ID: **7** Type: **not specified**

Introduction

Wednesday 8 December 2021 13:50 (10 minutes)

https://universityofsussex.zoom.us/j/99861220617

Contribution ID: **8** Type: **not specified**

Massless Preheating and Electroweak Vacuum Metastability

Wednesday 8 December 2021 15:00 (25 minutes)

Presenter: KOST, Jeff (University of Sussex)

Session Classification: First session of talks

Contribution ID: **9** Type: **not specified**

Mechanisms of neutrinoless double beta decay

Wednesday 8 December 2021 16:20 (20 minutes)

Neutrinoless double beta ($0\nu\beta\beta$) decay is a hypothetical process of crucial interest due to its sensitivity both to the neutrino mass scale and to lepton-number violation. The precision of searches for the decay is largely constrained by disagreement between different many-body models for their nuclear matrix elements (NMEs), due in part to the large nuclei involved and the presence of correlated nucleon states. This talk will give an overview of two parallel strands of research: 1) a computational study of the impact of correlated NME errors on future $0\nu\beta\beta$ searches, via Bayesian methodologies; and 2) an analysis of corrections to a known leading-order contact contribution (in chiral EFT) to the $0\nu\beta\beta$ transition operator, including from the gluon vacuum condensate and from inelastic intermediate nuclear states.

Presenter: VAN GOFFRIER, Graham (University College London)

Session Classification: Second session of talks