

Astrid Eichhorn, Universität Heidelberg
Title: Probing quantum gravity at all scales

Abstract:

To make progress in our understanding of the quantum structure of spacetime, we need observational tests of proposed theories of quantum gravity. However, this is challenging, because the Planck scale is many orders of magnitude removed from scales that we can probe directly with observations. Thus, we require lever arms that translate Planck-scale predictions into predictions at observationally accessible scales. In my talk, I will use asymptotically safe quantum gravity as a case study. I will show, how the interplay of quantum gravity with matter (both visible and “dark”) shapes the properties of matter fields in and beyond the Standard Model at the Planck scale. I will then show how to translate these Planck-scale predictions into predictions of Standard-Model properties as well as predictions about the properties of the dark matter and the dark energy.