

## Forging a link between quantum gravity and (beyond) Standard Model physics

*mercredi 29 août 2018 14:30 (30 minutes)*

Renormalization Group flows provide a link between Planck- and electroweak-scale physics, that could allow to test implications of quantum gravity at accessible energy scales [1]. Systematic truncations suggest the existence of a regime of asymptotically safe quantum gravity, in which gravity fluctuations induce a UV-completion of the matter sector. Within this scenario, the paradigm of asymptotic safety surpasses the predictive power of the Standard Model. It could retrodict the top mass, the bottom mass and the Abelian gauge coupling from first principles in a microscopic model including quantum gravity [2,3]. In our approximation, quantitative agreement with observations is only possible if the electric charge ratio of bottom and top lies in close vicinity to the Standard-Model value of  $Q_b/Q_t = -1/2$ . More generally, the asymptotic safety paradigm could give guidance for model building beyond the Standard Model. For instance, it places novel constraints on grand unification [4] and dark matter searches [5]. References: [1] A. Eichhorn and A. Held, Phys. Rev. D 96, no. 8, 086025 (2017). [2] A. Eichhorn and A. Held, Phys. Lett. B 777, 217 (2018). [3] A. Eichhorn and A. Held, arXiv:1803.04027 (2018). [4] A. Eichhorn, A. Held and C. Wetterich, arXiv:1711.02949 (2017). [5] A. Eichhorn, A. Held and P. Vander Griend, arXiv:1802.08589 (2018)

**Orateur:** HELD, Aaron