## **Particle Physics Challenges**



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## Consistent early and late time cosmology from the RG flow of gravity

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The compatibility of cosmological constraints on inflation and the cosmological constant with the asymptotic safety scenario of quantum gravity is discussed. The effective action is taken to be of f(R) form, truncated to second order. The flow generated by the Functional Renormalisation Group Equation is analysed and it is found to allow for trajectories that are compatible with the observational constraints on the parameters of the action, both at early and late cosmological times. In particular, the gravitational effective dynamics generated in the trans-Planckian regime flows to Starobinsky inflation at early times and to standard Einstein Gravity with a cosmological constant at late times. Moreover, the cosmological constant acquires an energy dependence at  $10^{-2}$  eV, increasing from its current value of  $10^{-66}$  eV<sup>2</sup> on Hubble scale to a value of  $10^{-30}$  eV<sup>2</sup> at inflation scale.

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