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Asymptotic freedom and safety in quantum gravity

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We compute non-perturbative flow equations for the couplings of quantum gravity in fourth order of a derivative expansion. The gauge invariant functional flow equation for arbitrary metrics allows us to extract β -functions for all couplings. In our truncation we find two fixed points. One corresponds to asymptotically free higher derivative gravity, the other is an extension of the asymptotically safe fixed point in the Einstein-Hilbert truncation or extensions thereof. Furthermore we describe the flow trajectories to different fixed points for a subtruncation of Higher derivative gravity. Based on arxiv:2111.04696

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