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The Einstein-Hilbert functional and K-stability

Given a polarised manifold $L \to X$, we explain how K-stability of (X, L) is related to properties of (a version of) the Einstein-Hilbert functional of the circle bundle associated to $L \to X$. This strongly hints at a possible connection between the Yau-Tian-Donaldson conjecture and the Yamabe problem; to exemplify how this point of view can be useful to understand the geometry of polarised manifolds, we will show a new proof of K-semistability of polarised manifolds admitting constant scalar curvature Kähler metrics. Based on arXiv:2310.11625, joint work with Abdellah Lahdili and Eveline Legendre.