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Soft-collinear gravity beyond leading power

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At first sight, perturbative gravity and gauge theory differ quite drastically at the Lagrangian level.
Whereas the soft limits of both theories share many similarities, their respective collinear limits are distinct.
Notably, unlike gauge theory, gravity does not feature any collinear divergences.
This motivates the construction of the soft-collinear effective theory for gravity in analogy to QCD SCET beyond leading power.

In this talk, I present the all-order construction of this effective theory in powers of the large scattering energy, focusing on the underlying concepts and the gauge symmetry, which provide a clear and intuitive structure. Employing covariance with respect to the emerging soft gauge symmetry, the Lagrangian can be formulated in terms of a finite number of gauge-covariant and -invariant building blocks and takes a strikingly similar form to the QCD SCET Lagrangian.
I discuss in detail how this emergent gauge symmetry arises and how it constrains the Lagrangian and the operator basis.

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