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Probing the nature of gravity on black hole horizons

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We describe a recently developed tool which enables a description
of spacetime as a manifold with a Lorentz-invariant limit length
built-in. This is accomplished in terms of quantities depending
on two spacetime events (bitensors) and looking at two-point function,
all this being well suited to embody nonlocality in the small scale.
What one obtains is a metric bitensor (called minimum-length metric
or quantum metric, or qmetric for brief), with components singular
in the coincidence limit of the two events capable to provide
a finite distance in the same limit.
We discuss here how this metric structure can be seen to include
also the case of null separated events,
and describe some results one gets with the null qmetric
which do have immediate thermodynamic/statistical
interpretation for horizons.
One of them is that the area transverse to null geodesics
converging to a base point goes to a finite value in the
coincidence limit (instead of shrinking to 0).
We comment on the discreteness this seems to imply
for the area of black hole horizons as well as on possible ensuing
effects in gravitational waves from coalescence of binary compact bodies.

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