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Geometric Z' Boson as Dark Matter and Its Implications for Black Hole Formation

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In this talk, we will show that metric-Palatini gravity, extended with the antisymmetric part of the affine Ricci tensor and extended also with a matter sector involving the affine connection, reduces dynamically to general relativity plus a geometric massive vector field such that the geometric vector couples to fermions in a universal fashion. We show that due to its geometrical origin this geometric vector, the geometric Z' , does not couple to scalars and vector bosons. It couples only and only to fermions in a universal fashion. We show that this geometric Z' could well be a viable dark matter candidate. We also show that this geometric Z' hampers black hole formation, and its matter couplings worsens the situation. We will briefly discuss possible black hole solutions in the Einstein-geometric Proca model in the AdS background and in the Symmergent gravity.

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