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Local SUSY, an unconventional approach

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Unconventional SUSY connects spacetime and internal symmetries, combining spin-1 gauge field and spin-1/2 matter particles in a single Lie superalgebra-valued connection. In this representation, states do not come in Bose-Fermi pairs, avoiding the doubling of particles and fields. If the local symmetry contains the Lorentz group, gravity is inevitably included, but there are no spin-3/2 or higher fundamental fields. Local SUSY is a conditional symmetry of the action, like local Poincaré or AdS invariances that depend on the nature of the spacetime background. The resulting systems are remarkably simple, closely resembling a standard quantum field theory and SUSY still emerges as a contingent symmetry, dependent on the features of the vacuum/ground state. We illustrate the general construction with some examples.

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