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# Collinear Superspace

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I will introduce a new set of effective field theory rules for constructing Lagrangians with $\mathcal{N} = 1$ supersymmetry in collinear superspace. In the standard superspace treatment, supersymmetry preservation is manifest at the Lagrangian level in part by the inclusion of auxiliary term components. By contrast, collinear superspace depends on a smaller set of coordinates and directly yields a formulation of supersymmetry on the light-cone that depends exclusively on propagating degrees of freedom, at the expense of obscuring Lorentz invariance and introducing apparent non-locality. While there exist superspace formulations of theories involving only on-shell physical degrees of freedom, these constructions are typically discovered starting with an on-shell component Lagrangian, and guessing the superspace formulation that reproduces the component level result. In contrast the new formalism I will introduce represents a way to derive on-shell superspace Lagrangians directly from the symmetries of the theory. After establishing the general framework, I will construct collinear superspace Lagrangians for chiral matter, non-Abelian gauge fields, and their interactions. An important ingredient is a superfield representation that is simultaneously chiral, anti-chiral, and real; this novel object encodes residual gauge transformations on the light cone. This work paves the way for constructing theories with $\mathcal{N} > 1$ supersymmetry directly from low-energy considerations.

## Parallel Session

Formal Field Theory and Strings

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