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Interacting UV fixed points and conformal windows of 4d super-Yang-Mills theories with matter

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Using RG methods, I discuss perturbative and non-perturbative fixed points and conformal windows in 4d supersymmetric gauge theories coupled to matter and a superpotential. At weak coupling, I give an overview of perturbative UV and IR fixed points and their corresponding phase diagrams. At strong coupling, I discuss how conformal fixed points and superfield anomalous dimensions are identified using the method of a -maximisation and the infinite-order Novikov-Shifman-Vainshtein-Zakharov beta functions. Results are illustrated for $SU(N) \times SU(M)$ supersymmetric gauge theories, and implications for model building beyond the minimally supersymmetric Standard Model are indicated.

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