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Department of
Theoretical Physics

Comapactifications of minimal 6d SCFTs to four dimensions

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We study compactifications on Riemann surfaces with punctures of N=(1,0) 6d SCFTs with a one dimensional tensor branch and no continuous global symmetries. The effective description of such models on the tensor branch is in terms of pure gauge theories with decoupled tensor. For generic Riemann surfaces, the resulting theories in four dimensions are expected to have N=1 supersymmetry. We compute the anomalies expected from the resulting 4d theories by integrating the anomaly polynomial of the 6d theory on the Riemann surface. For the cases with 6d gauge models with gauge groups SU(3) and SO(8) we further propose a field theory construction for the resulting 4d theories. For the 6d SU(3) theory, we argue that the theories in four dimensions are quivers with SU(3) gauge nodes and free chiral fields. The theories one obtains from the 6d SO(8) gauge theory are quivers with SU(4) gauge groups and chiral fields with R charge a half. In the last case the theories constructed for general Riemann surfaces involve gauging of symmetries appearing at strong coupling. The conformal manifolds of the models are constructed from gauge couplings and baryonic superpotentials. We support our conjectures by matching the dimensions of the conformal manifolds with complex structure moduli of the Riemann surfaces, matching anomalies between six and four dimensions, and checking the dualities related to different pair of pants decompositions of the surfaces. As a simple application of the results we conjecture that SU(3) gauge theory with nine flavors in four dimensions has a duality group acting on the seven dimensional conformal manifold which is the mapping class group of sphere with ten marked points.

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