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# Shai Chester "Bootstrapping critical 3d gauge theories"

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We consider the simplest class of 3d gauge theories, which is  $N$  complex scalar fields coupled to an Abelian gauge field. For large  $N$  this theory is known to flow to a CFT with  $SU(N) \times U(1)$  symmetry, but for finite  $N$  there is controversy in the literature. The  $N=2$  case is particularly famous, as it is believed to describe the Neel-VBS phase transition, which might be experimentally realizable. Previous lattice studies suggested the  $SU(2) \times U(1)$  symmetry is enhanced to  $SO(5)$ , but the assumption of no relevant  $SO(5)$  singlet was ruled out by the bootstrap. We perform a bootstrap study assuming  $SO(5)$  symmetry, and find a point on the boundary of the allowed region that matches large  $N$  predictions, and was recently confirmed by a newer lattice study. We also perform a bootstrap study of the  $N=3$  theory, and find a point on the boundary of the allowed region that matches large  $N$ , large charge, and lattice predictions.