

WILSON-'T HOOFT CLASSIFICATION AND GAPPED VACUA OF $N=1^*$ SUPER YM FROM THE VIEW OF 1-FORM SYMMETRY

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Since late 70's we have classified the gapped vacua of 4d Yang-Mills theory with adjoint matters by studying the area vs perimeter law of Wilson and 't Hooft loops, and this Wilson-'t Hooft classification plays an important role for our understanding of color confinement. Its original derivation, however, has subtlety related to the fact that magnetic (or dyonic) loops are not genuine line operators, and it is important to revisit this classification problem from the modern view of 1-form symmetry. We prove the 1-to-1 correspondence between the original Wilson-'t Hooft classification and the spontaneous breaking of 1-form symmetry stacked with the SPT states of unbroken symmetry, and examine it for the gapped vacua of $N=1^*$ supersymmetric Yang-Mills theory.