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Fractional instantons and Confinement: a T2XR2 roadmap

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We report results obtained for $SU(2)$ Yang-Mills theory on a 4d torus with two directions much smaller than the other two. The small 2-torus is equipped with twisted boundary conditions. This construction provides a way to interpolate from a region in which semiclassical methods can be applied (for small 2-torus size) to the standard infinite volume case. Our simulations at small torus sizes show how the topological charge and the string tension result from a gas of vortex-like fractional instantons. As the size becomes larger the density increases in agreement with fractional instanton liquid model picture of the Yang-Mills vacuum.

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