Higher qq-characters and S-duality of Wilson loops/surfaces

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Instanton computations in five-dimensional $\mathcal{N} = 1$ and $\mathcal{N} = 1^*$ theories on $\mathbb{R}^4 \times S^1$ usually require a UV regularization; however, in the presence of BPS operators the physically relevant regularization is often not known. We revisit this problem for Wilson loops in general representation: in this case a natural regularization is provided by a system of branes intersecting along S^1 (also known as higher qq-characters), whose partition function we show to contain the VEV of all such Wilson loops. We also discuss S-duality properties of Wilson loops in tensor product of the fundamental representation; in the case of $\mathcal{N} = 1^*$ $U(N)$ theories the S-dual configuration involves "Wilson surfaces" in a M-strings setting, descending from two sets of M5-branes intersecting along a surface.