coincide [11, 12], thus in some sense varying over the maximal range available (e.g. for SU(2) from $\mathbb{1}_2$ to $-\mathbb{1}_2$), whereas for trivial holonomy only one such location is found.

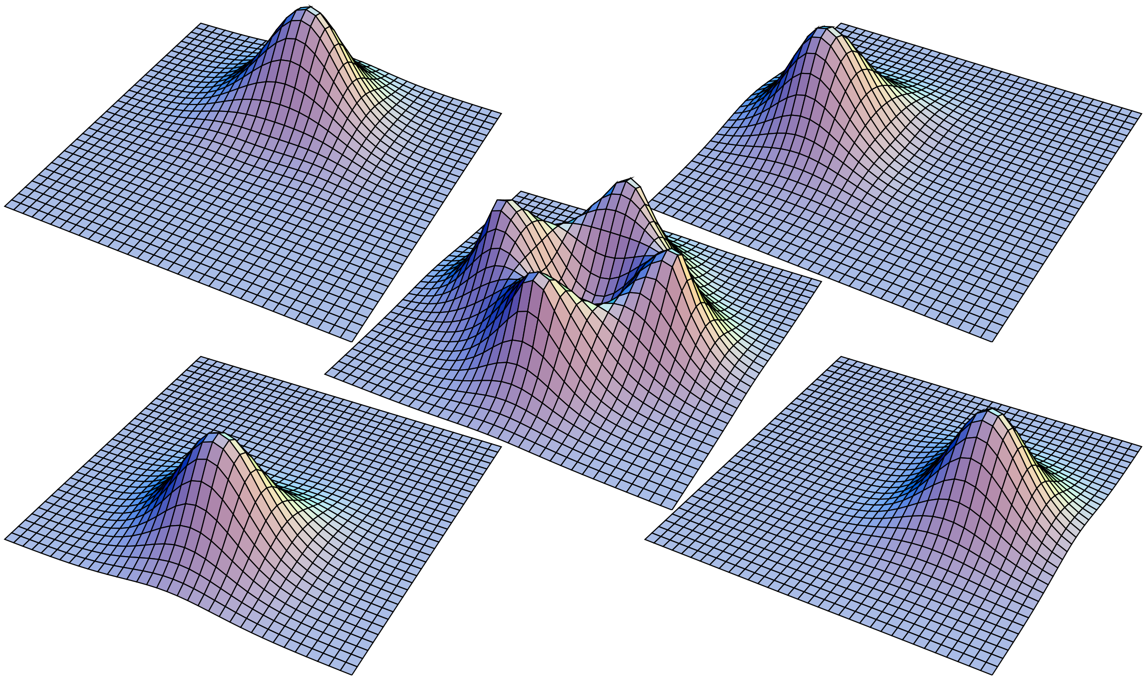

Figure 1: In the middle is shown the action density in the plane of the constituents at $t = 0$ for an SU(2) charge 2 caloron with $\mathrm{tr}\,\mathcal{P}_\infty = 0$, in the regime where constituents are not well-separated. On a scale enhanced by a factor $10\pi^2$ are shown the densitities for the two zero-modes, using either periodic (left) or anti-periodic (right) boundary conditions in the time direction. This solution is for the so-called "crossed" configuration with $\mathbf{k} = 0.997$ and $D = 8.753$, see Sect. 4 for more details.

On the other hand, when constituents of equal charge come together typically an extended core structure is found. This was deduced, in particular for the case of charge 2 calorons, from our ability to analytically determine the zero-mode density (summed over the two zero-modes implied by the index theorem) in the far field limit, neglecting exponential contributions[1]. In this limit it forms a singular distribution on a disc bounded by an ellipse, but approaches two delta functions for well-separated like-charge constituents. This zero-mode density only sees constituents of a given charge, depending on the boundary condition for the fermions in the imaginary time direction, which can be chosen to be a U(1) phase (containing the physically relevant choice of anti-periodic boundary conditions for thermal field theory). We will show for

[1]This is in some sense equivalent to the high temperature limit, with constituent masses given by $8\pi^2\nu_m/\beta$, such that the range of the exponential contributions shrinks inversely proportional with the temperature.