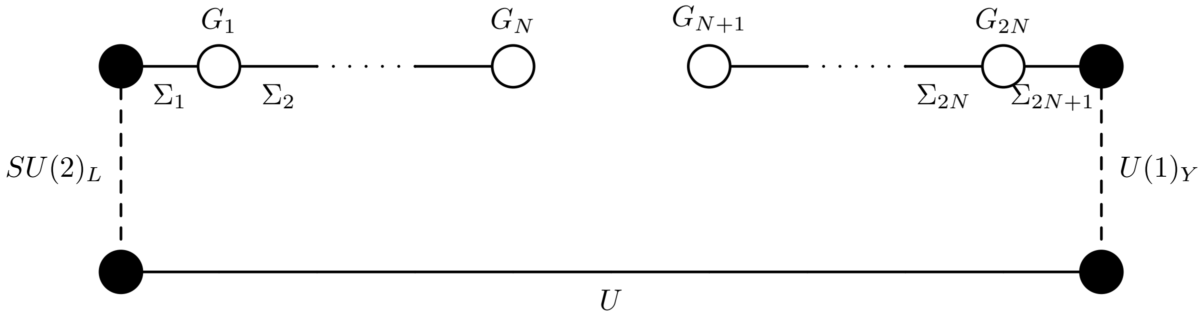


FIG. 1: *Graphic representation of the moose model described by the Lagrangian given in Eq.* (1). *The dashed lines represent the identification of the corresponding moose sites.*

## III. GENERALIZATION TO 5 DIMENSIONS

We now want to describe the continuum limit $N \to \infty$ of the Lagrangian given in Eq. (1). As it is well known, a $[SU(2)]^K$ linear moose model can be interpreted as the discretized version of a SU(2) 5D gauge theory. The GD-BESS model, however, has a number of new features with respect to a basic linear moose. In particular, we have the "cut link" and the presence of an apparently nonlocal field $U$ which connects the gauge fields of the $SU(2)_L \otimes U(1)_Y$ local symmetry.

To be able to properly describe the 5D generalization, we need a representation for the 5D metric. Since the deconstructed model possesses ordinary 4D Lorentz invariance, the extra-dimensional metric must be compatible with this symmetry. Such a metric can in general be written in the form:

$$ds^2 = b(y)\eta_{\mu\nu}\, dx^\mu dx^\nu + dy^2, \tag{6}$$

where $\eta$ is the standard Lorentz metric with the $(-,+,+,+)$ signature choice, $y$ the variable corresponding to the extra dimension and $b(y)$ is a generic positive definite function, usually known as the "warp factor". We normalize $b(y)$ by requiring that $b(0) = 1$. For definiteness, we will consider a finite extra dimension, with $y \in (0, \pi R)$. With this choice, it is possible to write down an identification between the GD-BESS and the continuum limit parameters:

$$\frac{g_i^2}{N} \to \frac{g_5^2}{\pi R}, \quad f_i^2 \to b(y)\frac{N}{\pi R g_5^2}, \tag{7}$$

where $g_5$ is a 5D gauge coupling, with mass dimension $-1/2$. As can be seen, a general choice for the $g_i$ implies that $g_5$ is "running" , with an explicit dependence on the extra variable.