$$A(a, s_k) := A_3(a, s_k) = \pm 1, \tag{D25}$$

together with the following definitions and $**$ means quaternion multiplication.

$$\text{Da} := \text{q}(0, a_x, a_y, a_z), \tag{D26}$$
$$\text{Ls}_1 := \text{q}(0, s_x, s_y, s_z), \tag{D27}$$
$$\mathbf{q_a} := \text{Da**Ls}_1 = \mathbf{a}\cdot\mathbf{s}_1 + \mathbf{r}_1 \sin(\mathbf{a} - \mathbf{s}_1) \tag{D28}$$
$$\lambda_A(a, s_k) := +\,\text{sign}\left[\sin\{a - (s_k + \xi)\}\right], \tag{D29}$$
$$qA(a, s_k) := \begin{cases} +\text{sign}\left[\text{Re}(\mathbf{q_a})\right] \text{ if } |\text{Re}(\mathbf{q_a})| \geqslant \beta \cos^2\left[\frac{s_k}{\phi}\right], \\ +\text{sign}\left[\sin\{a - (s_k + \xi)\}\right] \text{ if } |\text{Re}(\mathbf{q_a})| < \beta \cos^2\left[\frac{s_k}{\phi}\right], \end{cases} \tag{D30}$$
$$\lambda_1 := \begin{cases} 0 \text{ if } |\text{Re}(\mathbf{q_a})| \geqslant \beta \cos^2\left[\frac{s_k}{\phi}\right], \\ k \text{ if } |\text{Re}(\mathbf{q_a})| < \beta \cos^2\left[\frac{s_k}{\phi}\right], \end{cases} \tag{D31}$$
$$A_3(a, s_k) := \begin{cases} -qA(a, s_k)(2) \text{ if } \lambda_2 = k \text{ and } qA(a, s_k)(2) \neq \lambda_A(a, s_k), \\ +qA(a, s_k)(2) \text{ otherwise,} \end{cases}$$
$$\text{[spinorial sign change corrections described in (32)]}, \tag{D32}$$

where β, ϕ, and ξ are adjustable parameters that remain unchanged throughout the experiment (cf. the discussion by Bell in [21]). The number in parentheses is the position in the table row. Note that, because the trial number k is a part of the hidden variable or the common cause s_k originating in the overlap of the backward light-cones of Alice and Bob, it is *shared* between them. Similar to the local prescription for Alice, we propose that the results observed by Bob is specified by the function

$$B(b, s_k) := B_3(b, s_k) = \pm 1, \tag{D33}$$

together with the following definitions

$$\text{Db} := \text{q}(0, b_x, b_y, b_z), \tag{D34}$$
$$\text{Ls}_2 := -\,\text{q}(0, s_x, s_y, s_z), \tag{D35}$$
$$\mathbf{q_b} := \text{Ls}_2\text{**Db} = \mathbf{b}\cdot\mathbf{s}_2 + \mathbf{r}_2 \sin(\mathbf{b} - \mathbf{s}_2) \tag{D36}$$
$$\lambda_B(b, s_k) := -\,\text{sign}\left[\sin\{b - (s_k + \xi)\}\right], \tag{D37}$$
$$qB(b, s_k) := \begin{cases} +\text{sign}\left[\text{Re}(\mathbf{q_b})\right] \text{ if } |\text{Re}(\mathbf{q_b})| \geqslant \beta \cos^2\left[\frac{s_k}{\phi}\right], \\ -\text{sign}\left[\sin\{b - (s_k + \xi)\}\right] \text{ if } |\text{Re}(\mathbf{q_b})| < \beta \cos^2\left[\frac{s_k}{\phi}\right], \end{cases} \tag{D38}$$
$$\lambda_2 := \begin{cases} 0 \text{ if } |\text{Re}(\mathbf{q_b})| \geqslant \beta \cos^2\left[\frac{s_k}{\phi}\right], \\ k \text{ if } |\text{Re}(\mathbf{q_b})| < \beta \cos^2\left[\frac{s_k}{\phi}\right], \end{cases} \tag{D39}$$
$$B_3(b, s_k) := \begin{cases} -qB(b, s_k)(2) \text{ if } \lambda_1 = k \text{ and } qB(b, s_k)(2) \neq \lambda_B(b, s_k), \\ +qB(b, s_k)(2) \text{ otherwise,} \end{cases}$$
$$\text{[spinorial sign change corrections described in (32)]}, \tag{D40}$$