So we are trying to sample from:

group

$$p(y_t \mid \mathcal{M}, x; \hat{\theta}) \approx \frac{1}{M} \sum_m p_m(y_t \mid y_g^m)$$

$$p(y_t \mid y_g^m) = \frac{p(y_t, y_g^m)}{p(y_g^m)}$$

$$= \frac{\frac{1}{Z_1(\alpha, \beta)} e^{-\alpha \sum_s \delta(y_{t,s} \neq y_g^m) - \beta \sum_{(r,s)} \delta(y_{t,r} \neq y_{t,s})}}{\frac{1}{Z_2(\beta)} e^{-\beta \sum_{(r,s)} \delta(y_{g,r}^m \neq y_{g,s}^m)}}$$

$$\simeq \frac{Z_2}{Z_1} e^{-u}$$

u is the sum over all pairwise voxels in y_g, and we need to compute u for M times in order to evaluate y_t. There is no way to cancel u when sampling one voxel of y_t

for voxel s,

$$p(y_{t,s} \mid y_{t,-s}, y_g) = \frac{1}{M} \sum_m p(y_{t,s} \mid y_{t,-s}, y_g)$$

Althrought the Z_2/ Z_1 term is same for all m y_g samples and can be cancelled to compute the conditional probably at voxel s, the blue color u is a sum over all pairwise voxels in y_g, and is different for each sample of y_g. So, to sample one voxel of y_t, we need to compute u, thus having to go over all pair of voxels of y_g