

# Solvable initial states

- No shading: returns solvable matrix product state

$$\mathcal{N}_{ad}^{(b,c)} = \begin{array}{c} b \quad c \\ | \quad | \\ a - \text{---} \mathcal{N} \text{---} d \end{array}$$

- Corresponding state

$$\begin{aligned} |\Psi(\mathcal{N})\rangle &= \sum_{\{i_j\}}^q \dots \begin{array}{c} i_1 \quad i_2 \\ | \quad | \\ \text{---} \mathcal{N} \text{---} \end{array} \begin{array}{c} i_3 \quad i_4 \\ | \quad | \\ \text{---} \mathcal{N} \text{---} \end{array} \begin{array}{c} i_5 \quad i_6 \\ | \quad | \\ \text{---} \mathcal{N} \text{---} \end{array} \dots |\dots i_1 i_2 i_3 i_4 i_5 i_6 \dots\rangle \\ &= \sum_{\{i_j\}}^q \text{Tr} \left[ \dots \mathcal{N}^{(i_1, i_2)} \mathcal{N}^{(i_3, i_4)} \mathcal{N}^{(i_5, i_6)} \dots \right] |\dots i_1 i_2 i_3 i_4 i_5 i_6 \dots\rangle \end{aligned}$$

- Horizontal unitarity corresponds to unitarity of  $\mathcal{W}$

$$\mathcal{W}_{ab,cd} = \mathcal{N}_{ad}^{(b,c)}$$

$\Rightarrow$  Parametrized by **unitary matrix**