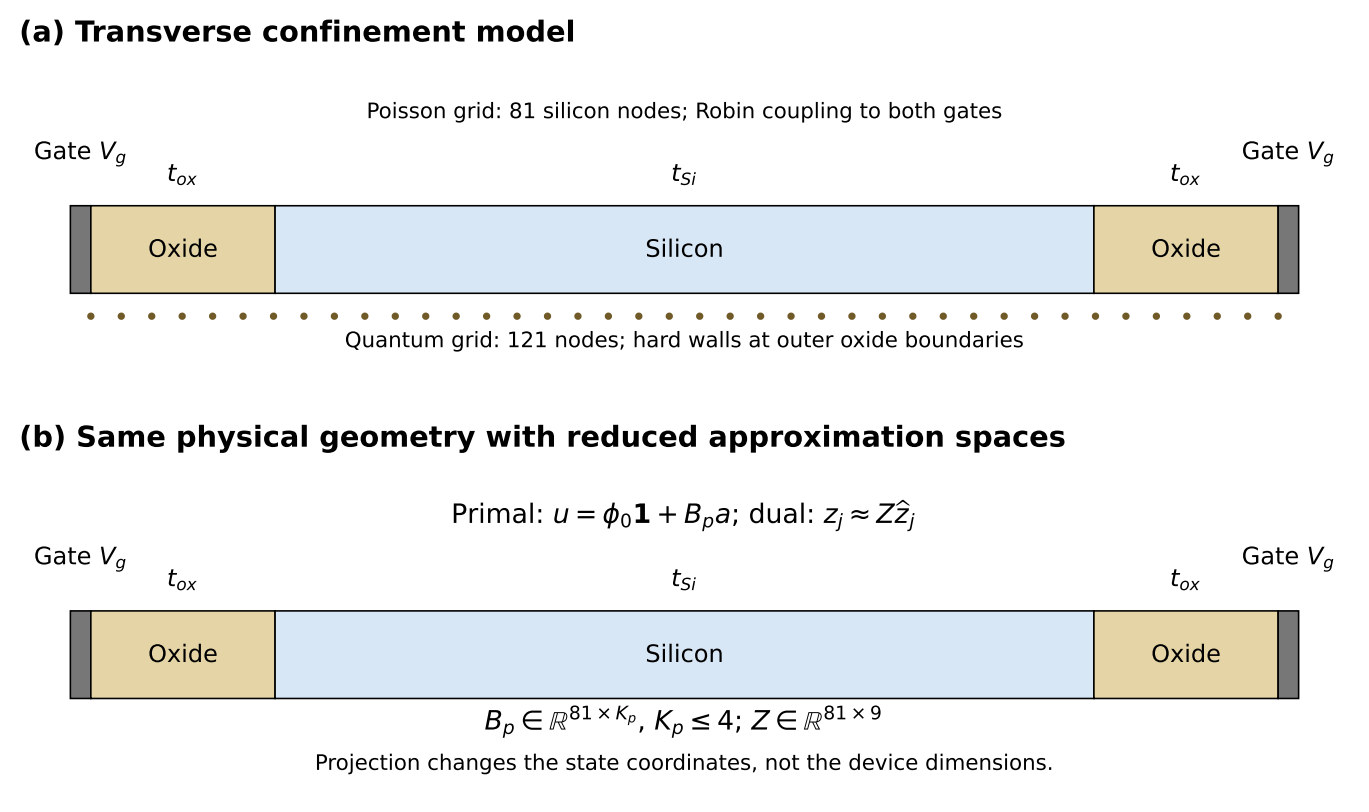
(a) Transverse confinement model
Poisson grid: 81 silicon nodes; Robin coupling to both gates
Gate V_g
t_{ox}
t_{Si}
t_{ox}
Gate V_g
Oxide
Silicon
Oxide
Quantum grid: 121 nodes; hard walls at outer oxide boundaries
(b) Same physical geometry with reduced approximation spaces
Primal: $u = \phi_0 \mathbf{1} + B_p a$; dual: $z_j \approx Z\hat{z}_j$
Gate V_g
t_{ox}
t_{Si}
t_{ox}
Gate V_g
Oxide
Silicon
Oxide
$B_p \in \mathbb{R}^{81 \times K_p}$, $K_p \le 4$; $Z \in \mathbb{R}^{81 \times 9}$
Projection changes the state coordinates, not the device dimensions.