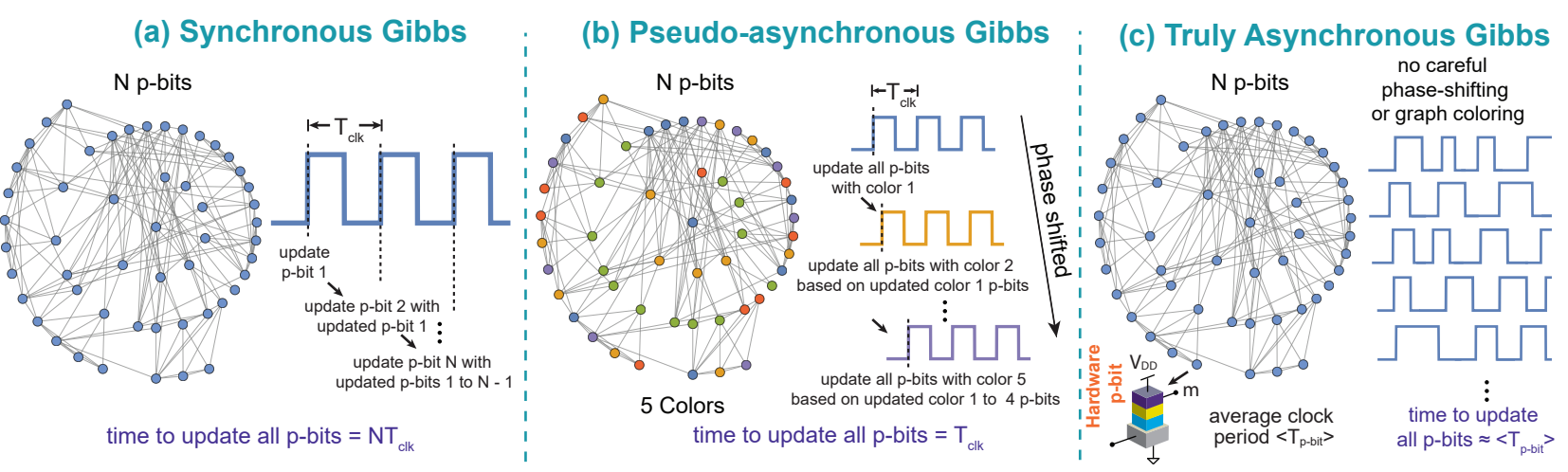
(a) Synchronous Gibbs
N p-bits
T clk
update p-bit 1
update p-bit 2 with updated p-bit 1
update p-bit N with updated p-bits 1 to N - 1
time to update all p-bits = NT clk
(b) Pseudo-asynchronous Gibbs
N p-bits
T clk
update all p-bits with color 1
update all p-bits with color 2 based on updated color 1 p-bits
update all p-bits with color 5 based on updated color 1 to 4 p-bits
phase shifted
5 Colors
time to update all p-bits = T clk
(c) Truly Asynchronous Gibbs
N p-bits
no careful phase-shifting or graph coloring
Hardware p-bit
VDD
m
average clock period <T p-bit>
time to update all p-bits ≈ <T p-bit>