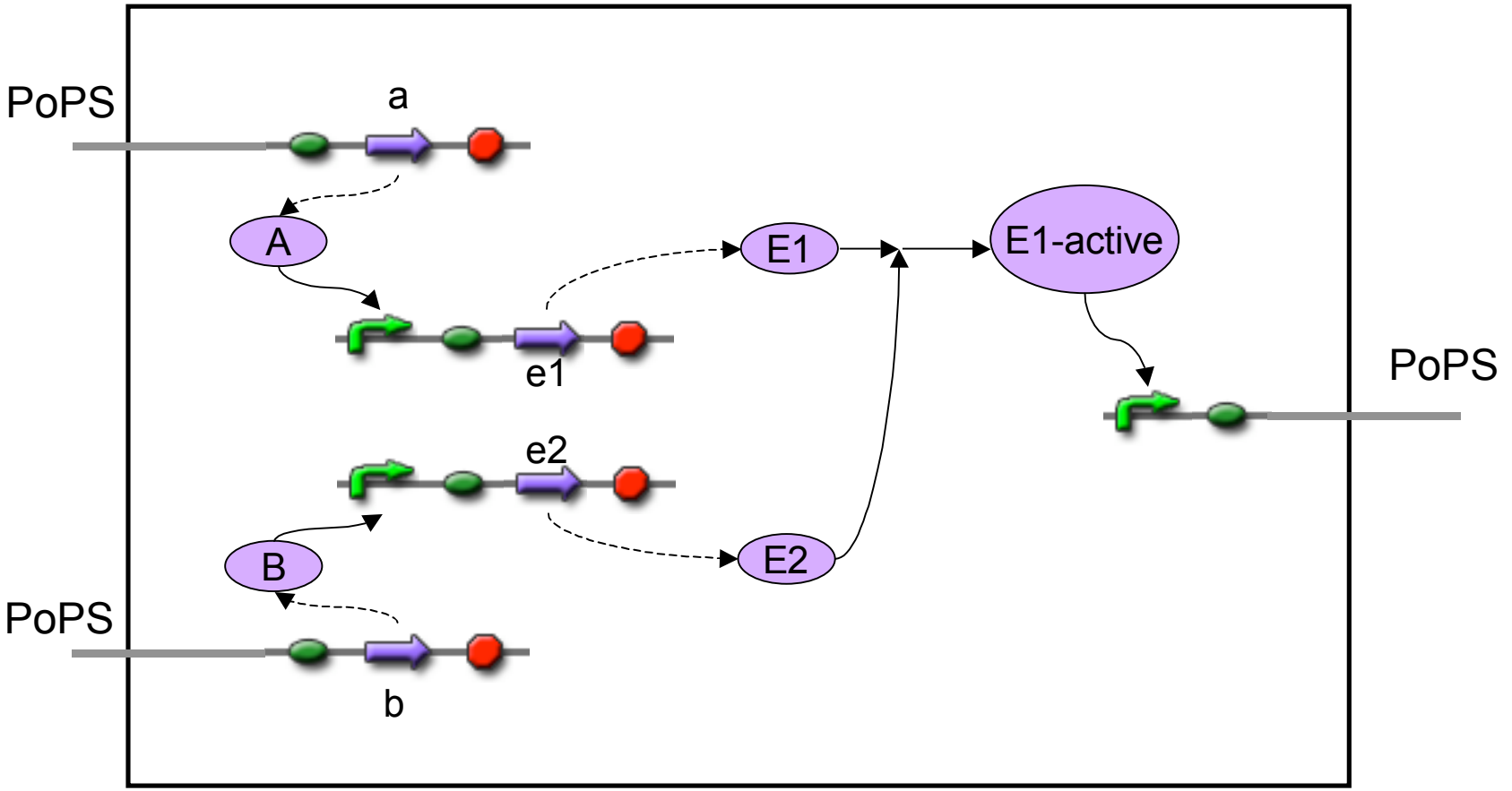
ETH
Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

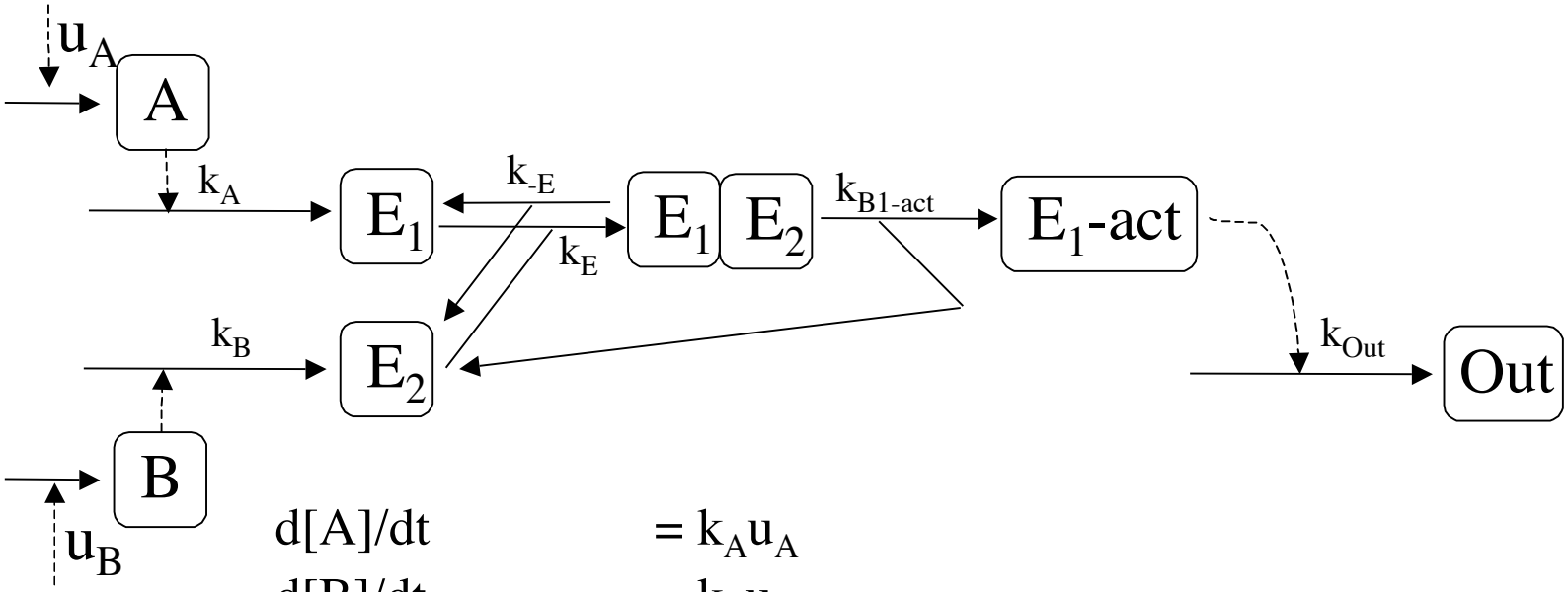
iGEM 2006

Half Adder - Modelling

AND – 1

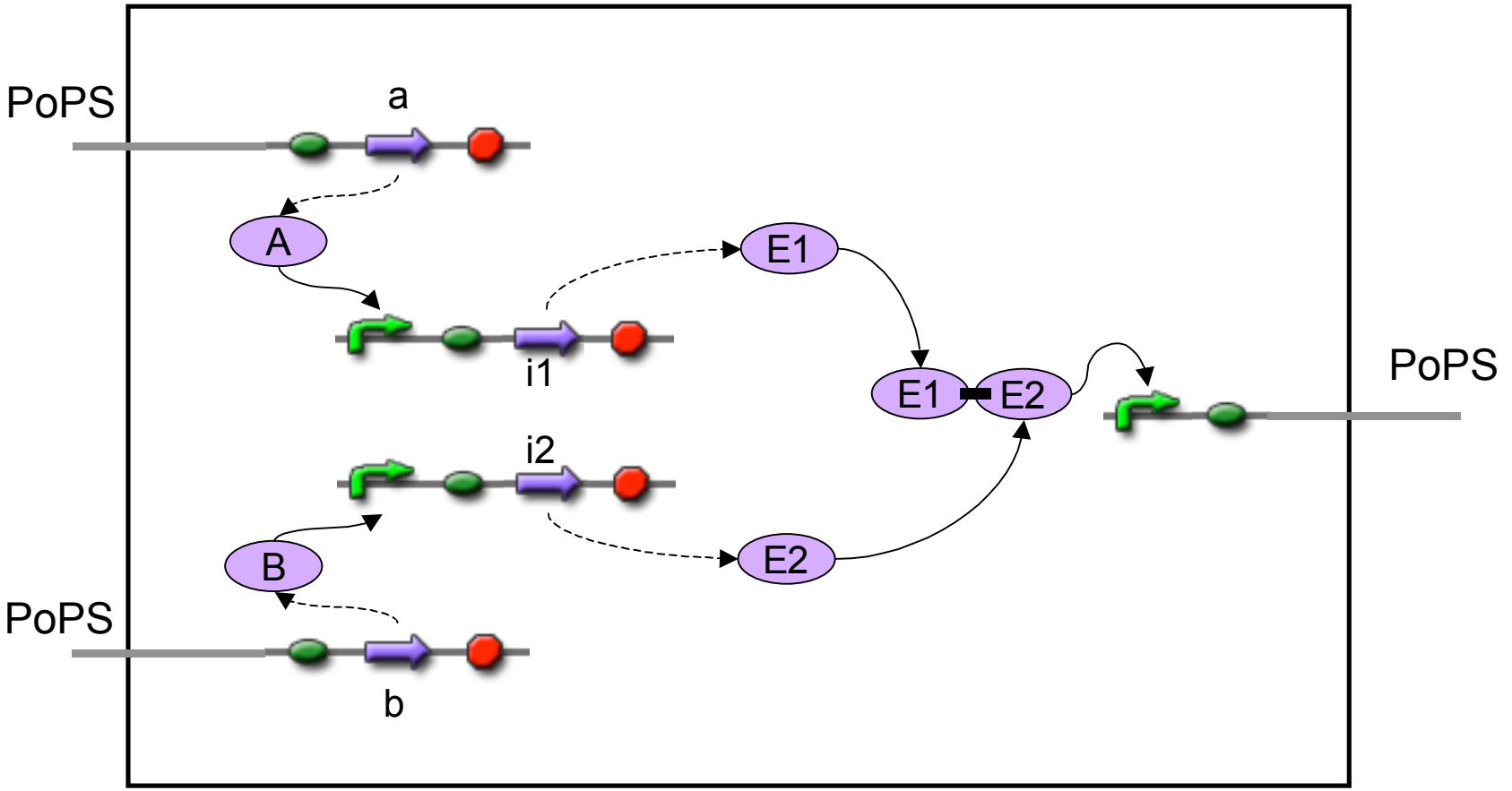


AND – 1 (ODE's)

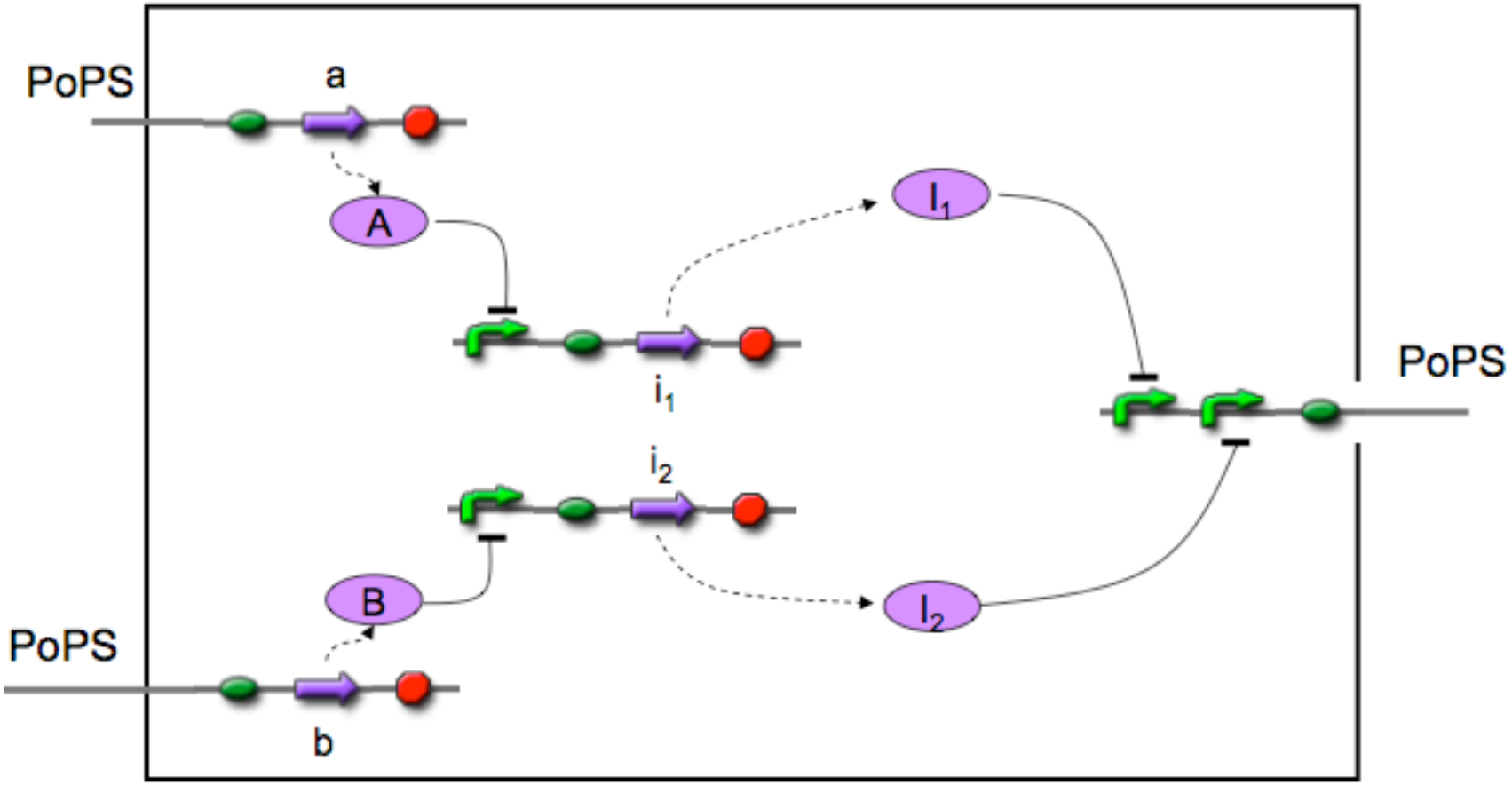


$$
\begin{aligned}
d[A]/dt &= k_A u_A \\
d[B]/dt &= k_B u_B \\
d[E_1]/dt &= k_{E1}[A] - k_E[E_1][E_2] + k_{-E}[E_1E_2] \\
d[E_2]/dt &= k_{E2}[B] - k_E[E_1][E_2] + k_{-E}[E_1E_2] + k_{E1\text{-}act}[E_1E_2] \\
d[E_1E_2]/dt &= k_E[E_1][E_2] - k_{-E}[E_1E_2] - k_{E1\text{-}act}[E_1E_2] \\
d[E_1\text{-}act]/dt &= k_{E1\text{-}act}[E_1\,E_2] \\
d[Out]/dt &= k_{out}[E_1\text{-}act]
\end{aligned}
$$

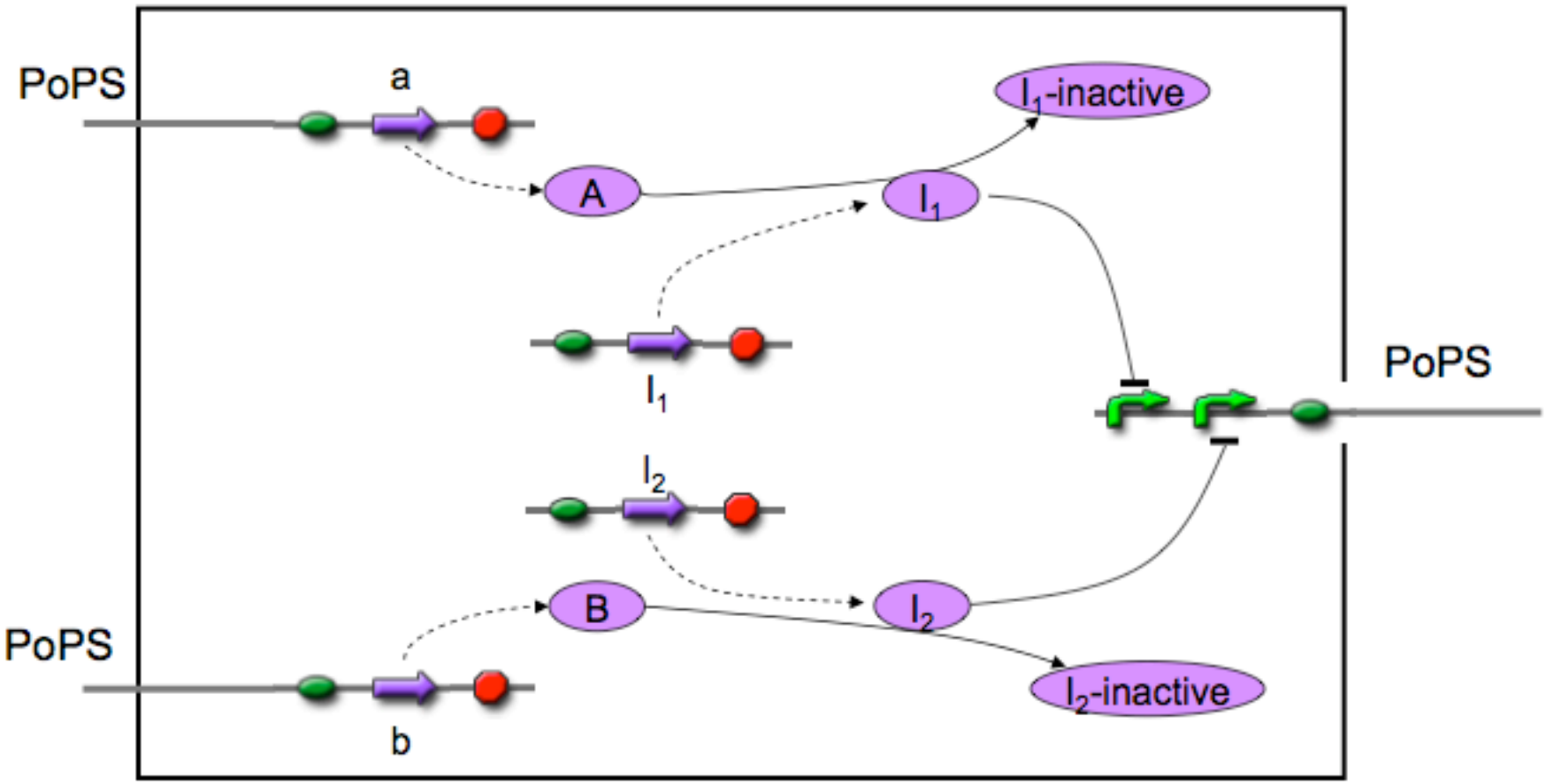
AND – 2

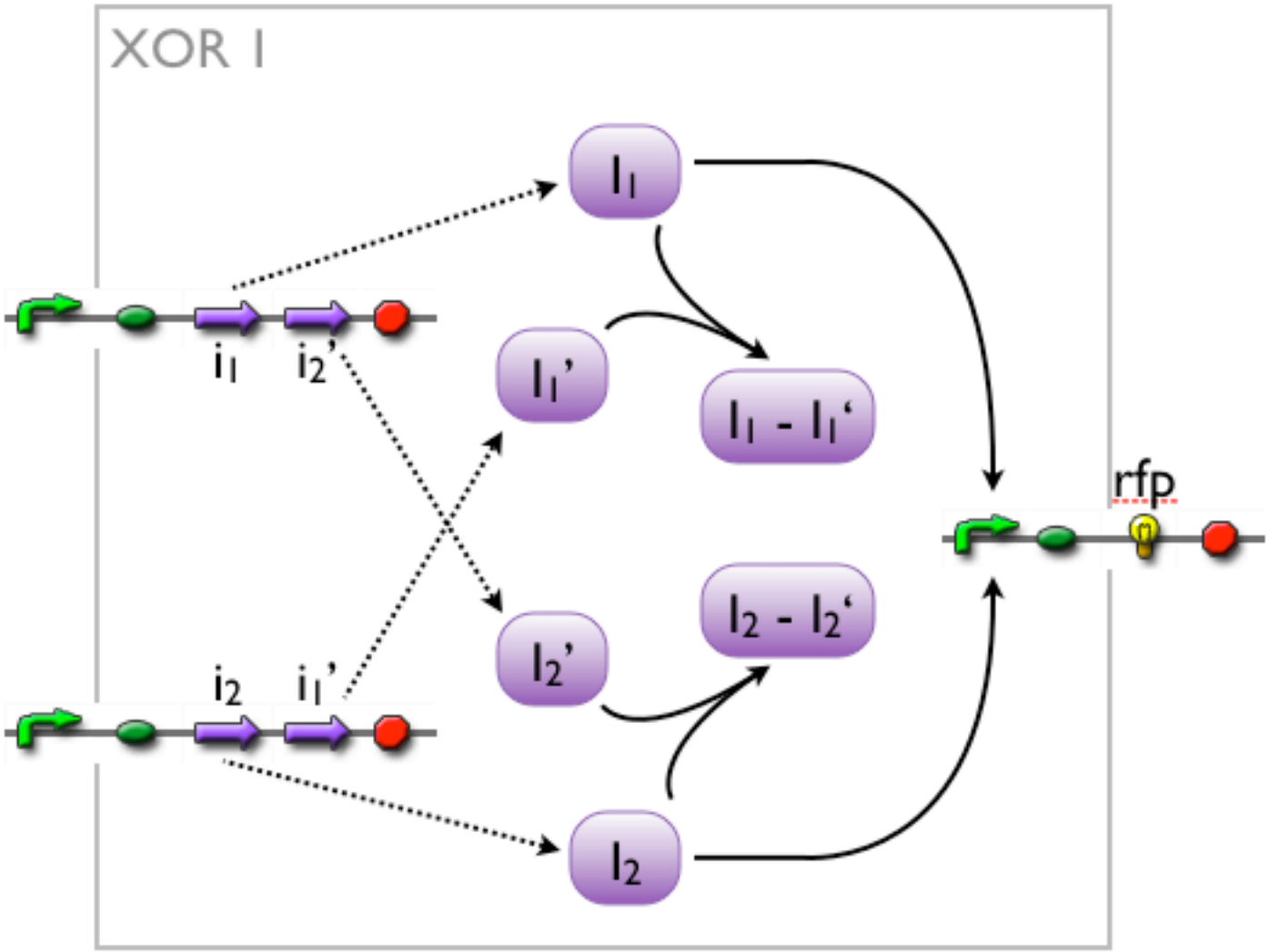


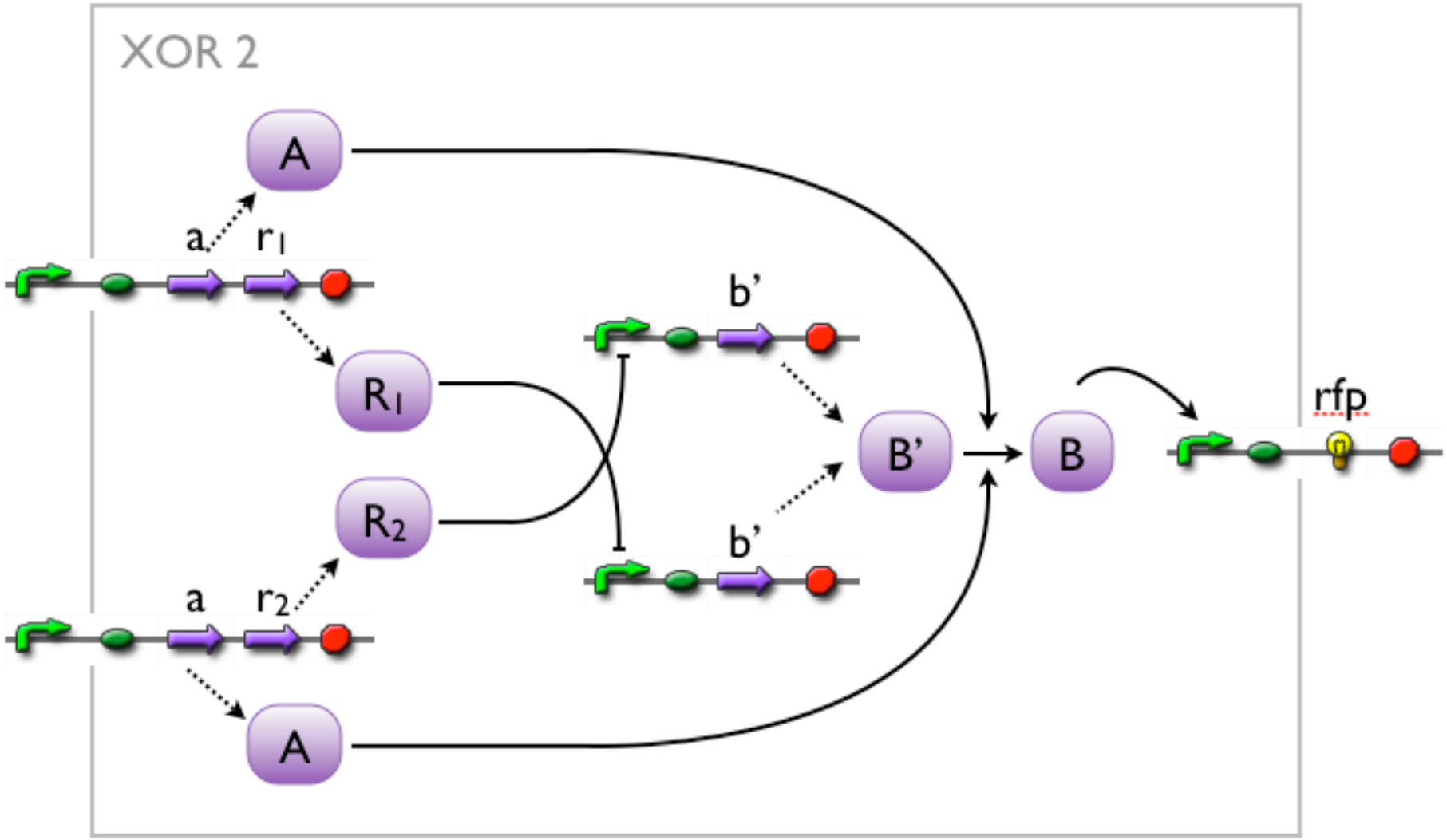
AND – 3

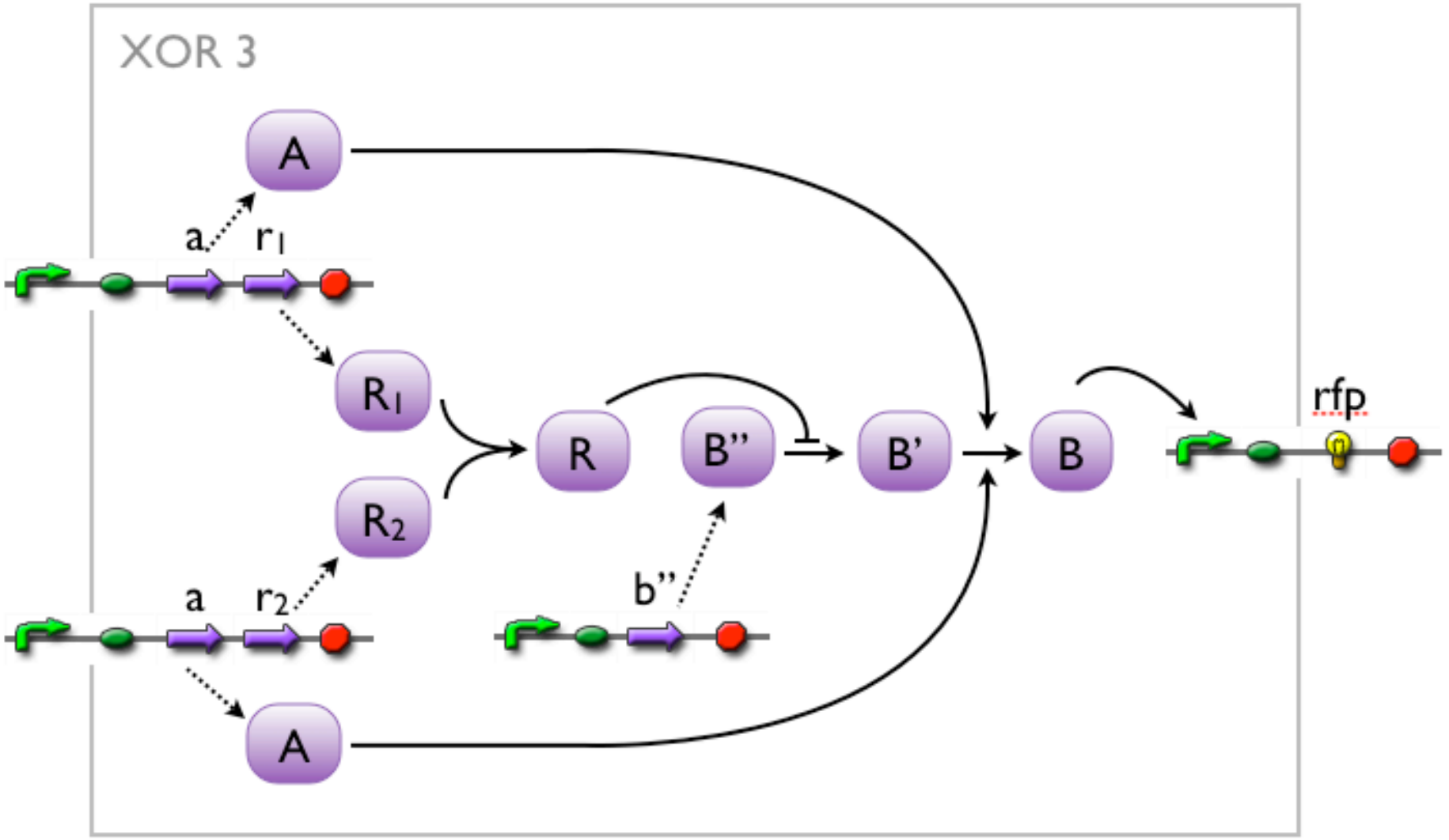


AND – 4




XOR I
I_1
I_1'
$I_1 - I_1'$
I_2
I_2'
$I_2 - I_2'$
i_1
i_2'
i_2
i_1'
rfp


XOR 2
A
a
r1
R1
b'
B'
B
rfp
R2
b'
a
r2
A


XOR 3
A
a
r1
R1
R2
R
B''
B'
B
rfp
a
r2
b''
A