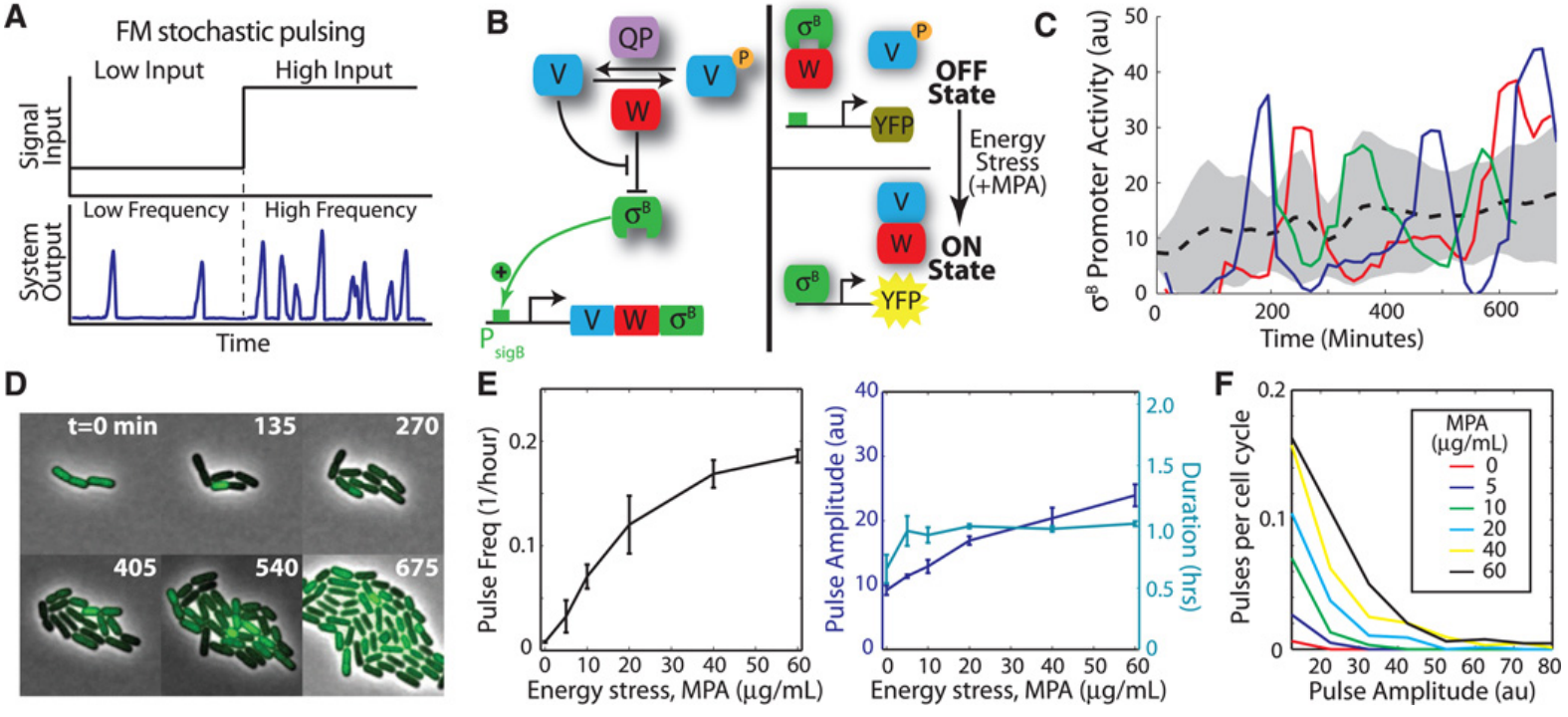
The heterodimer auto-repression loop : a robust and flexible pulse-generating genetic module

B. Lannoo[1,2], E. Carlon[1] and M. Lefranc[2]

[1] Institute for Theoretical Physics, KU Leuven [2] PhLAM, University of Lille

In some biological systems, biological information is carried by the frequency of a sequence of pulses of almost constant shape.

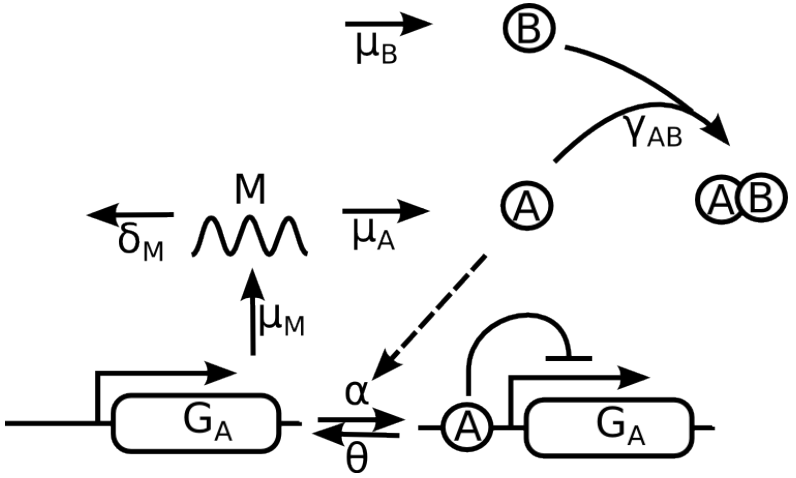


How can we design a genetic module that generates robust pulses in protein concentration separated by a tunable interval ?

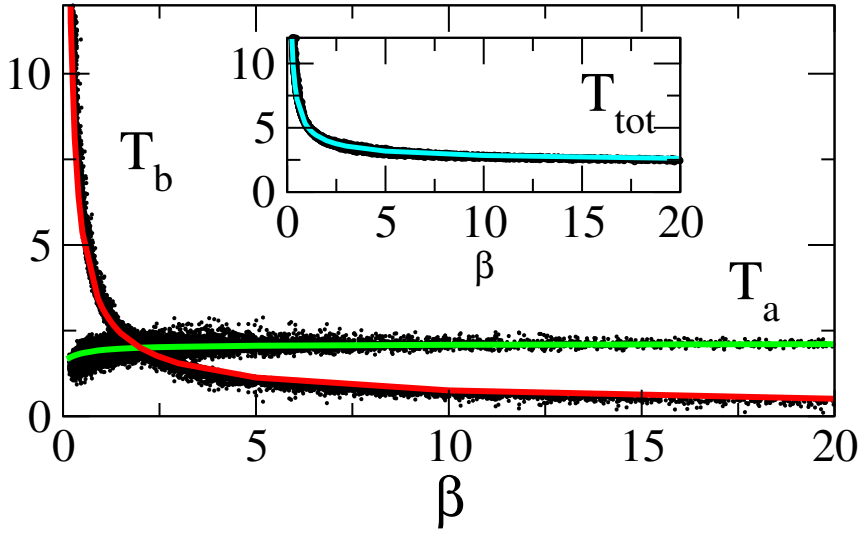
A robust and flexible pulse-generating genetic module

Lannoo, Carlon and Lefranc, Phys. Rev. Lett. 117, 018102 (2016)

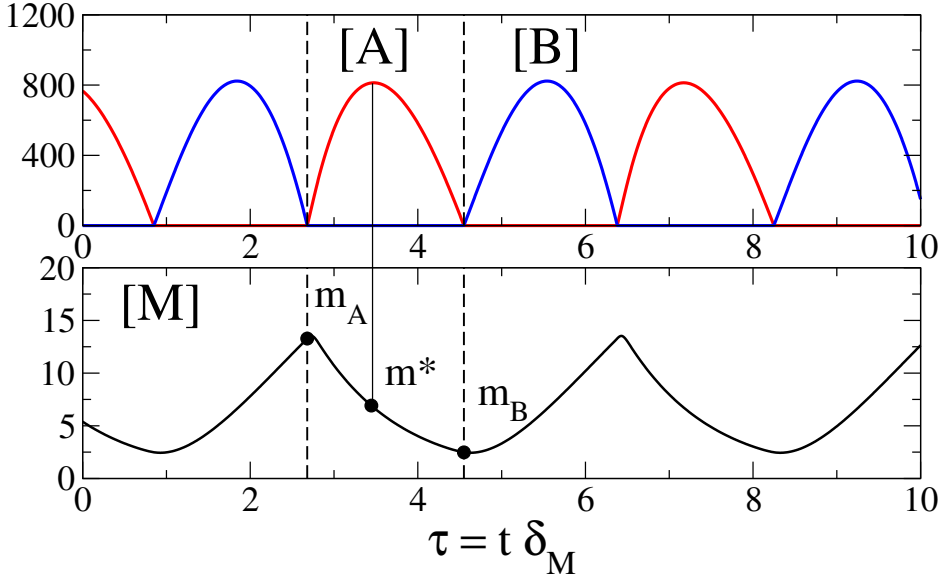
Protein A binds to its own gene, repressing it, or binds to protein B.



The duration of A pulses varies little but the duration of B pulses can be flexibly tuned



Alternating pulses of A and B .



Stochastic simulations of this network