Single DNA molecules are well characterized

- Enables rate determination

Data
Fit

Theory: Marko & Siggia, *Macromol* '95

$$F(x) = \left(\frac{k_B T}{L_p} \right) \left[\frac{1}{4(1-x)^2} - \frac{1}{4} + x \right]$$

Force (pN)

Extension (nm)
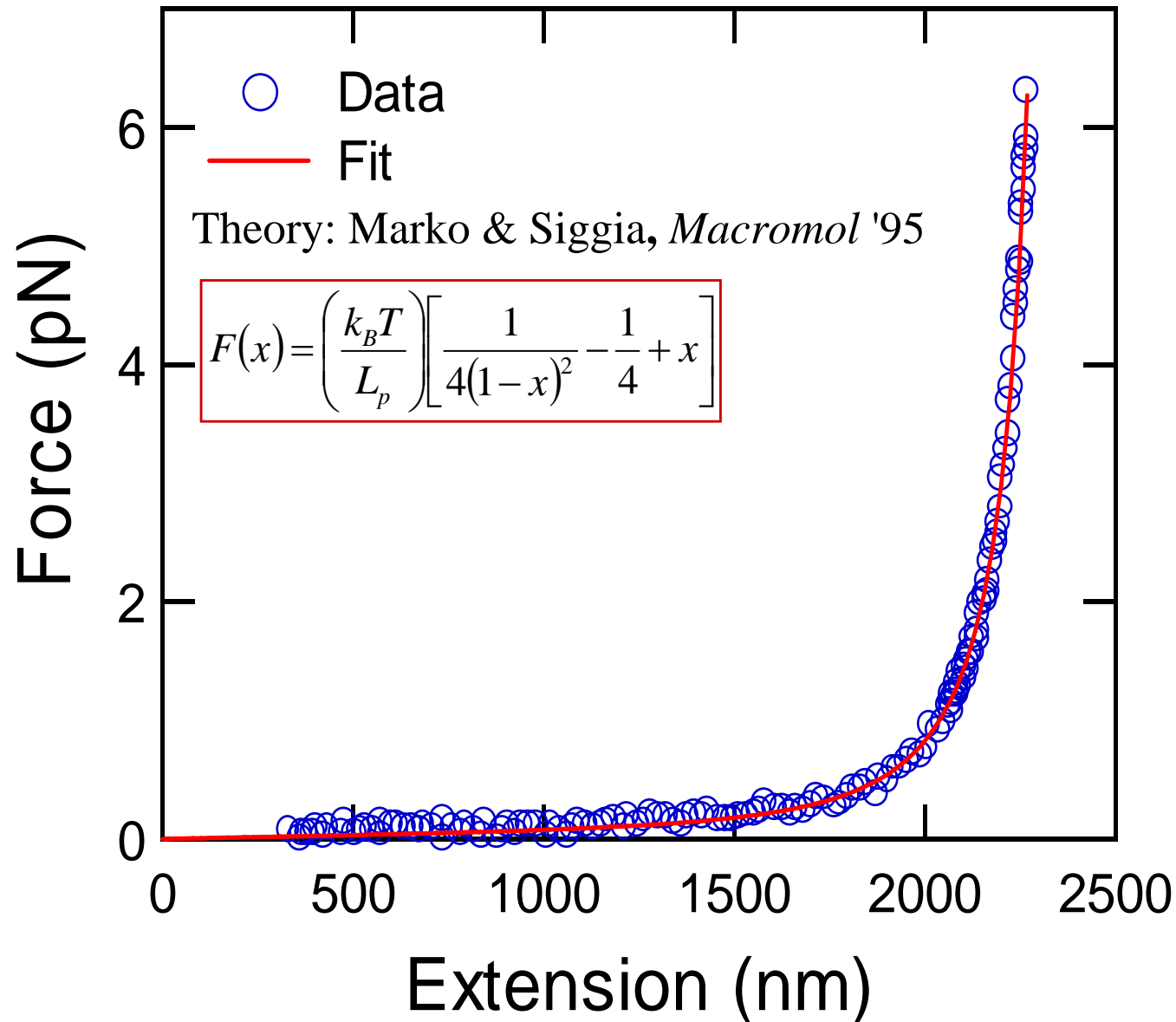
Explanation of graph

k_B= boltzman constant
T = temperature in K
L_p= Persistence length (measure of bending stiffness)
… how long it looks straight for (50 nm for double stranded dna)
… single stranded dna ~1nm

k_bT = 4.1 pN-nm for 293K
L_p= 50 nm

So k_bT=4.1 * T/293K (gives pN-nm)

x = extension/total length of dna
x = end-to-end between beads / contour length of dna

Picture shown for
2413 nm dna strand