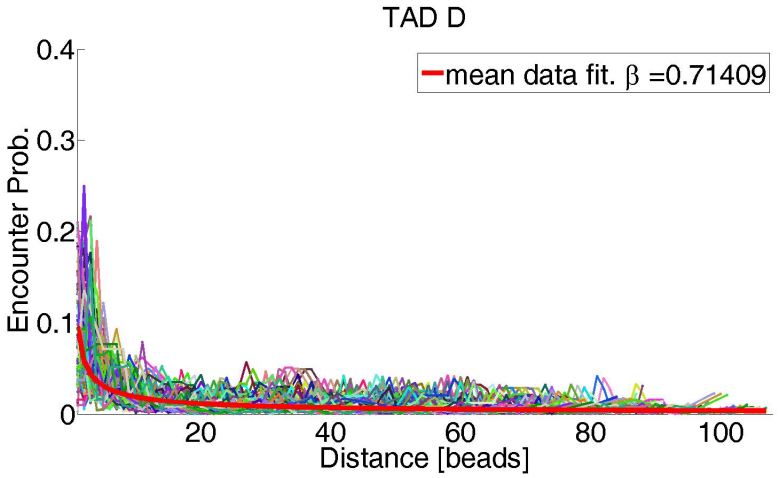
0.1 Peak Calling

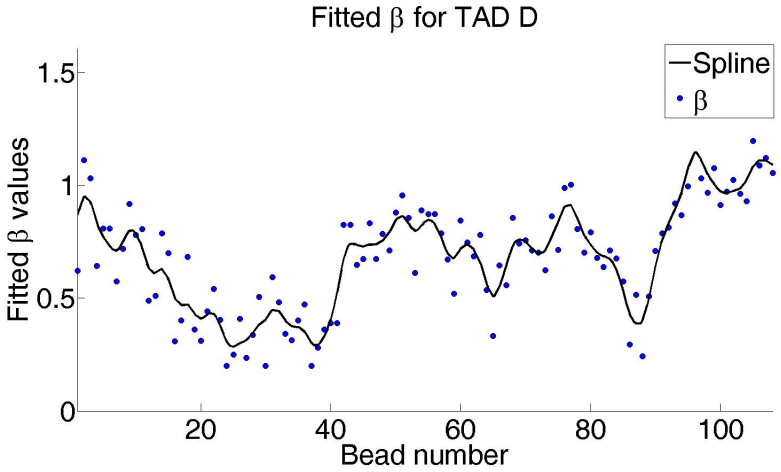
To accurately identify pair of beads that interact more frequently than expected, we ran a peak calling procedure on the 5C probability data of each TAD separately. For each bead $i = 1..N$ of the chain, we fit an encounter probability curve of the form $\alpha_i d^{-\beta_i}$. We then use the values of the fitted curves at each distance $d = 1..(N-1)$ to estimate the expected encounter probability, $\mu(d) = E[\alpha_i d^{-\beta_i}]$, and the expected standard-deviation, $\sigma(d) = \sqrt{E[(\mu(d) - \alpha_i d^{-\beta_i})^2]}$, for each d, and $i = 1...N$.

For each observation i at distance d we calculate a z-score by $z_i(d) = \frac{|\alpha_i d^{-\beta_i} - \mu(d)|}{\sigma(d)}$ and fit a Weibull distribution to it. For each z-score a p-value is calculated based on the fitted Weibull CDF and then transformed into a q-value to obtain false discovery rate. We then threshold the data using false discovery rate of 0.01.

The automated procedure resulted in 62 peaks in TAD E, and

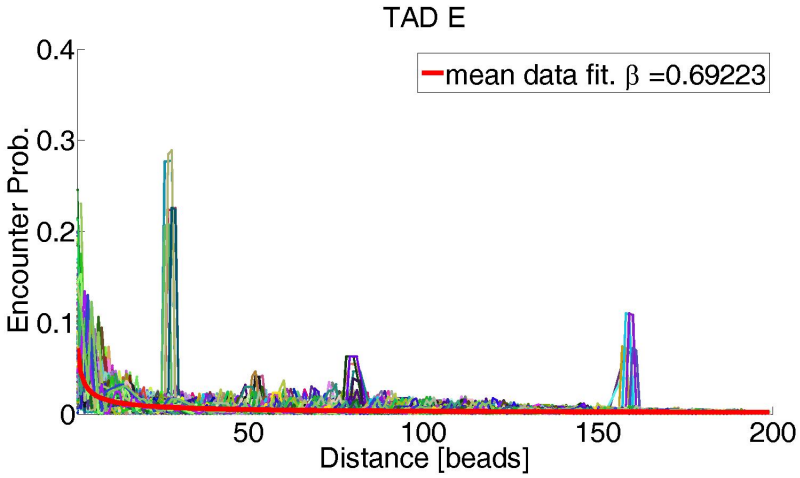


(a)

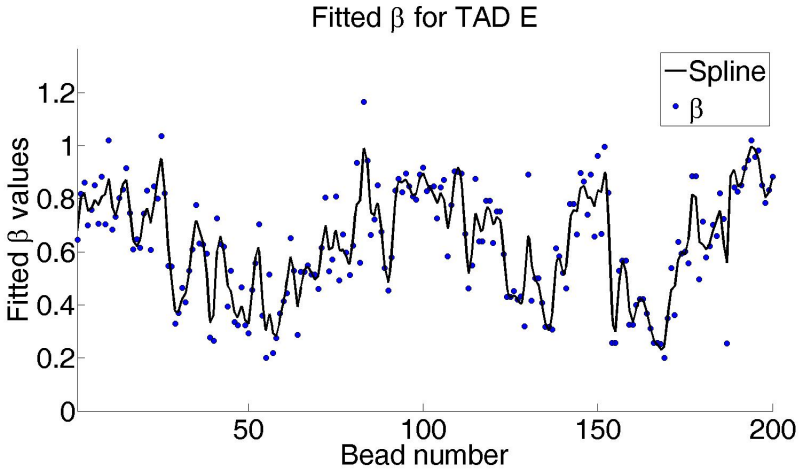


(b)

Figure 1: The encounter probability and the fitted β values for TAD D.



(a)



(b)

Figure 2: The encounter probability and the fitted β values for TAD E.