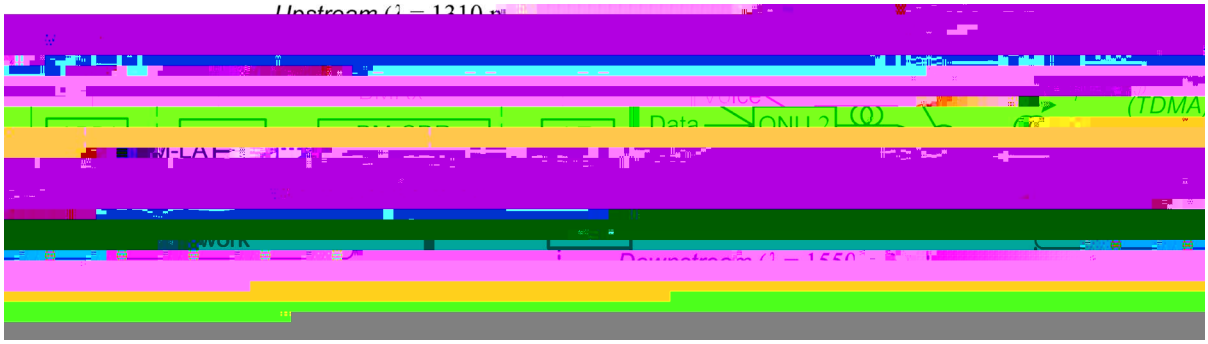
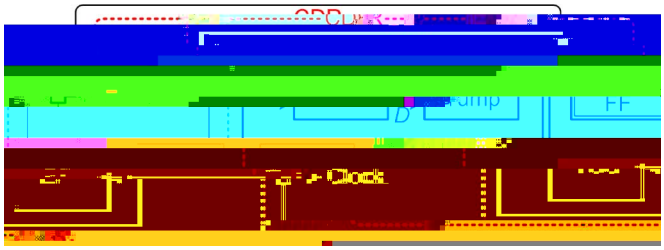

Upstream (λ = 1310 nm)
Data
ONU 2
(TDMA)
M-LAE
Downstream (λ = 1550



B. B -M de C ck a d Da a Rec e

1) P b e f C ck Rec e :

$S_{NRZ}(f)$

$$S_{NRZ}(f) = \frac{T_b}{2}\left[\frac{\sin(\pi f T_b)}{\pi f T_b}\right]^2$$

f T_b

0, $\pi/2$, π $\Delta\phi$ =

t_{inst} k^{th}

$\Delta\phi$ 2π |

$(k + 1)^{th}$

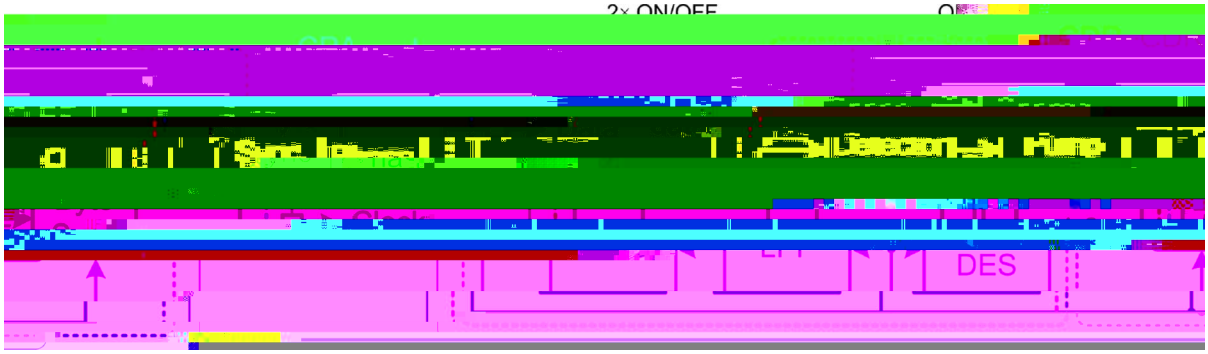
I

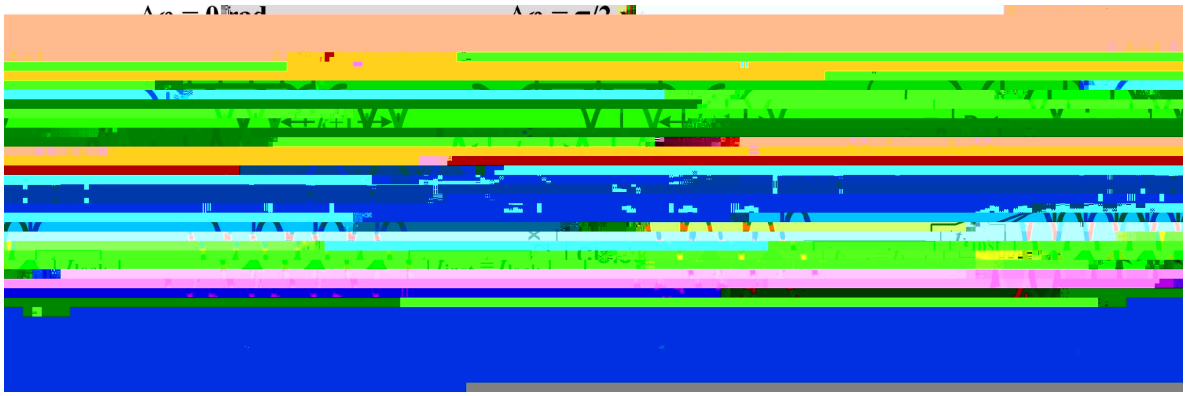
$\eta(I) = \varphi_{osc}/\varphi_{in}$

t_{inst} t_{lock}

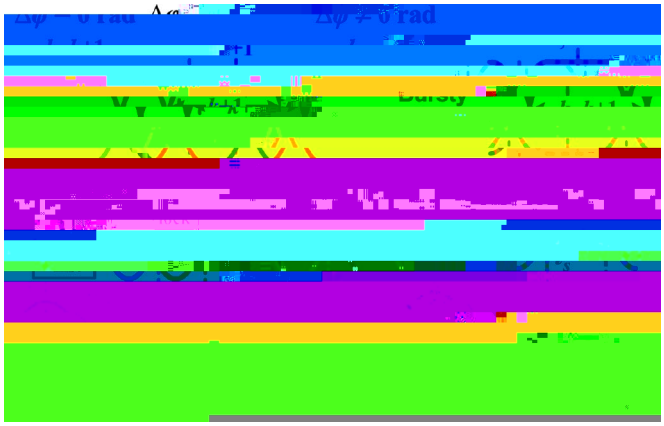
$$\lim_{\eta(I)\to 1} t_{inst} = t_{lock}.$$

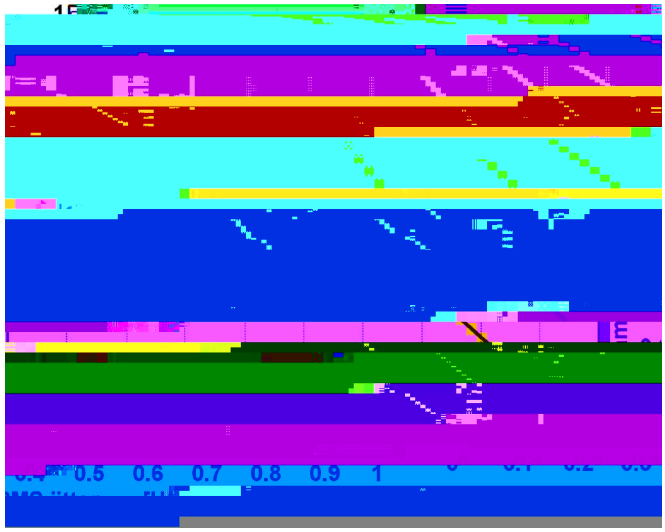
I





t_{odd} t_{even} $\Delta\phi = 0,\ \pi/2,\ \pi$





$\widetilde{t_o}$

$Q(\cdot)$ Q

$$Q(x) \triangleq \frac{1}{\sqrt{2\pi}} \int_x^{\infty} \exp\left(-\frac{\lambda^2}{2}\right) d\lambda.$$

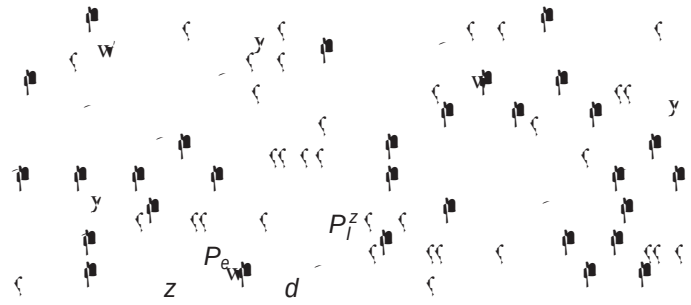
σ_{t_s} T_b σ_{t_s}

$(|\widetilde{t_o}$

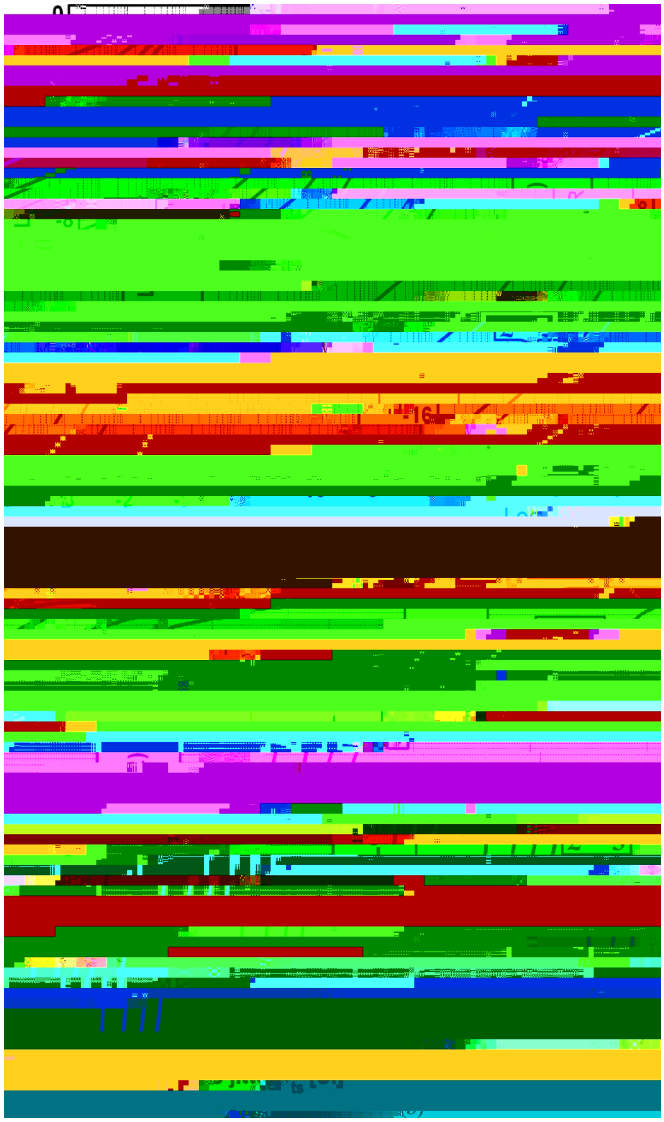
$$P\left(|\tilde{t}_s| \quad \frac{T_b}{2}\right) = \frac{1}{2}\left\{Q\left(\frac{\frac{T_b}{2} \quad \tilde{t}_o \quad t_{\Delta\phi}}{\sigma_{t_s}}\right) \right.$$

$$\left. + Q\left(\frac{\frac{T_b}{2} \quad \tilde{t}_o + t_{\Delta\phi}}{\sigma_{t_s}}\right)\right\}.$$

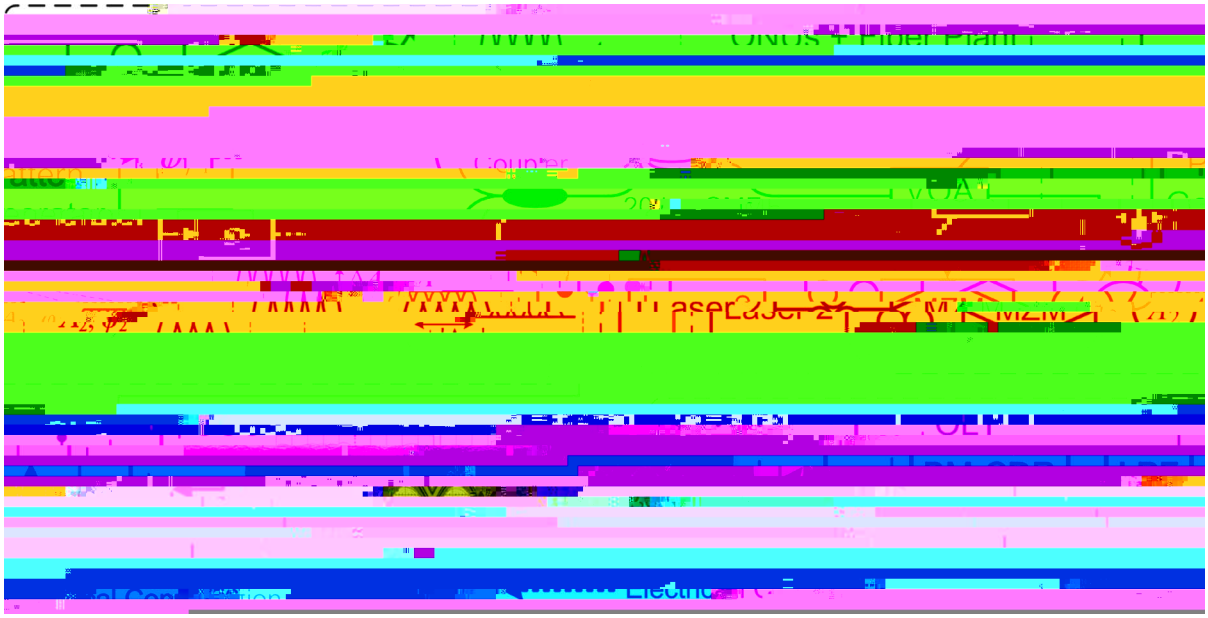
C. PLR P babi i M de

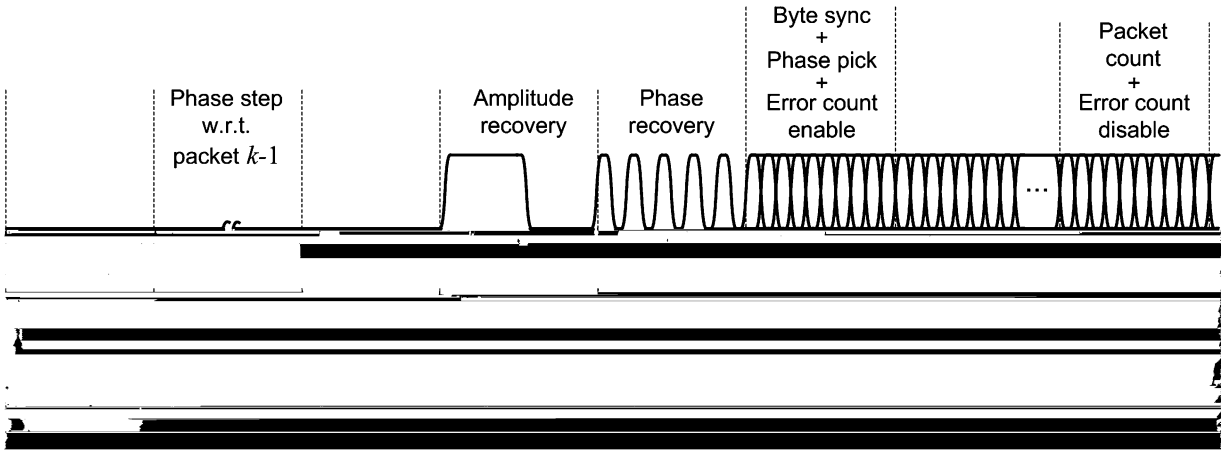


$$P_{l_z} \quad \sum_{j=z+1}^{d} (j) \blacktriangleright (z+1), \qquad P_e \quad 1$$




2×ON/OFF
ON/OFF
ON/OFF
Data
Byte
Sync
Detector
1:16





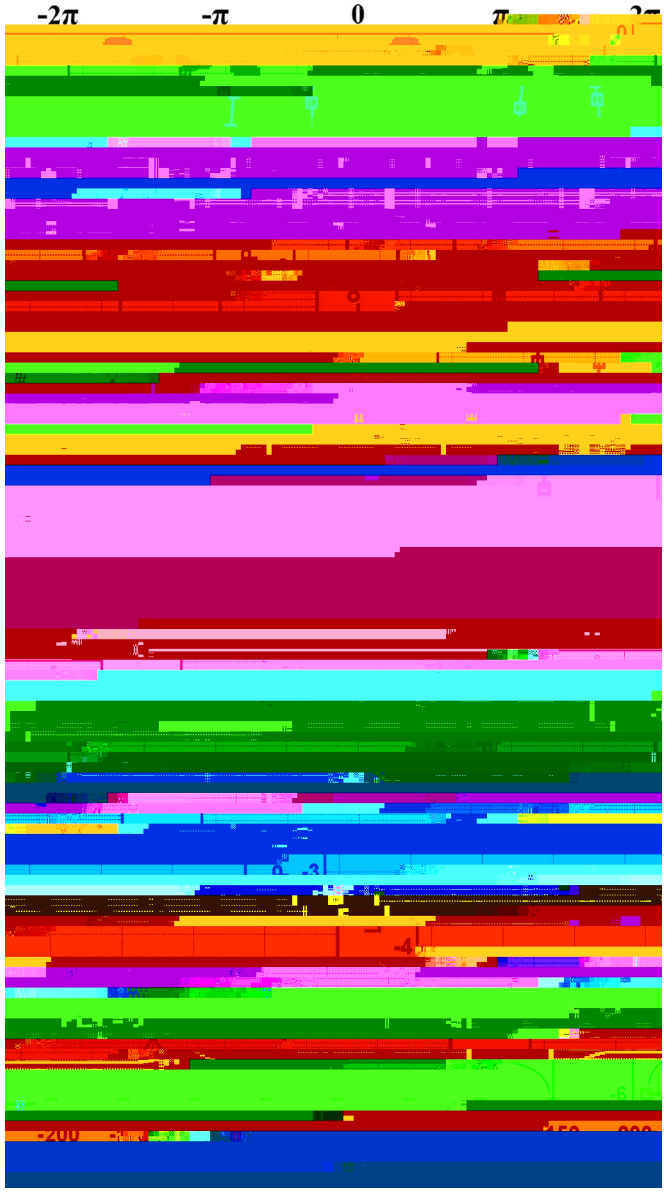
3) F e e c Ac i i i Ra ge:

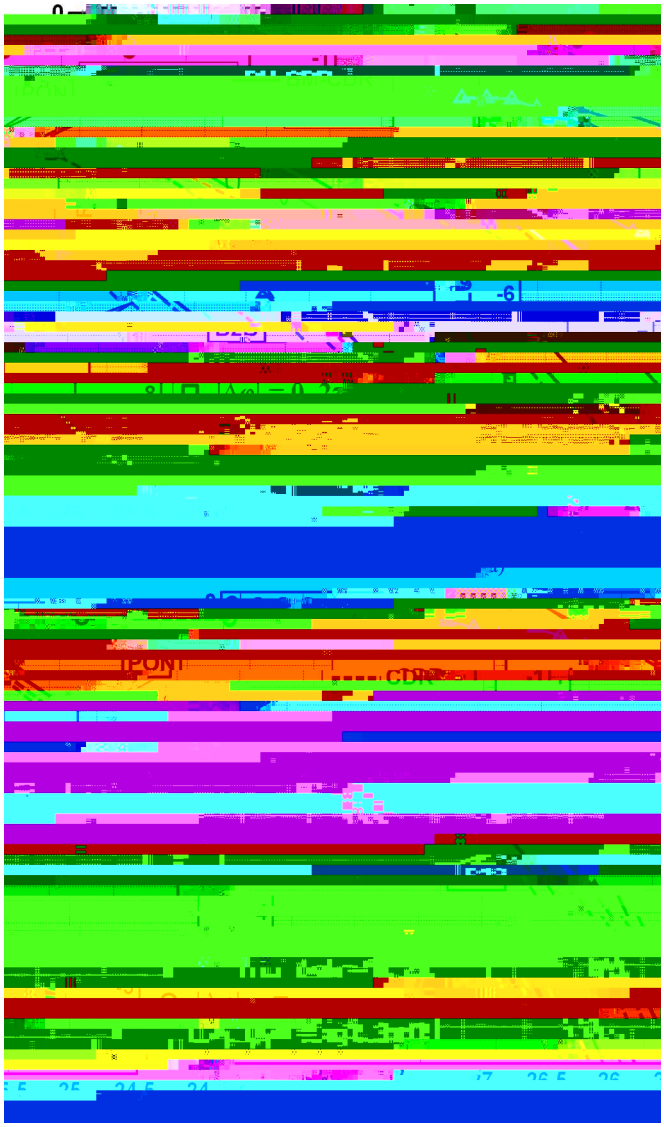
4) Se i i i Mea e e :

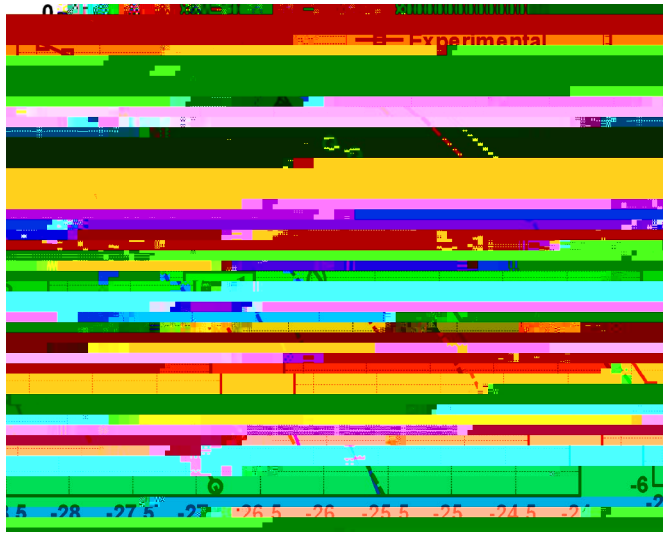
5) D a ic Ra ge:

A_1

A_2


-2π
-π
0
π





C. PON Efficiency

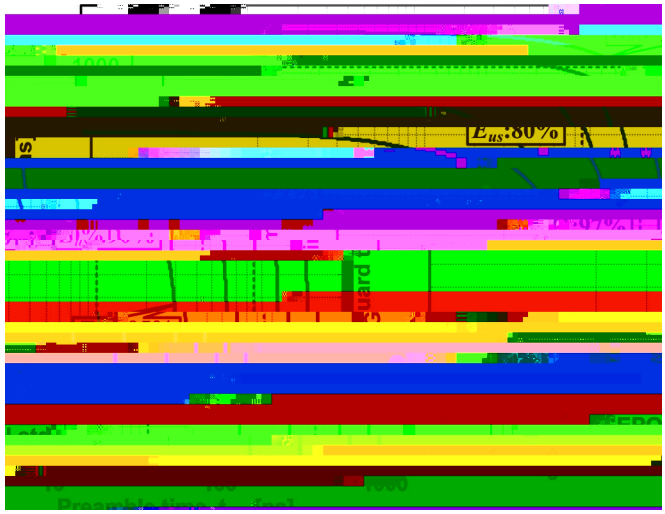
$$E_{us} = 1 - \frac{n_{ONU} t_{oh}}{T_{DBA}}$$

n_{ONU} t_{oh} T_{DBA} T_{DBA}

$$T_{DBA} = + t_{delay}$$

t_{delay}

200 μ



t_{pre}

$t_{oh} = 1856$

$t_{gt} = 1024$

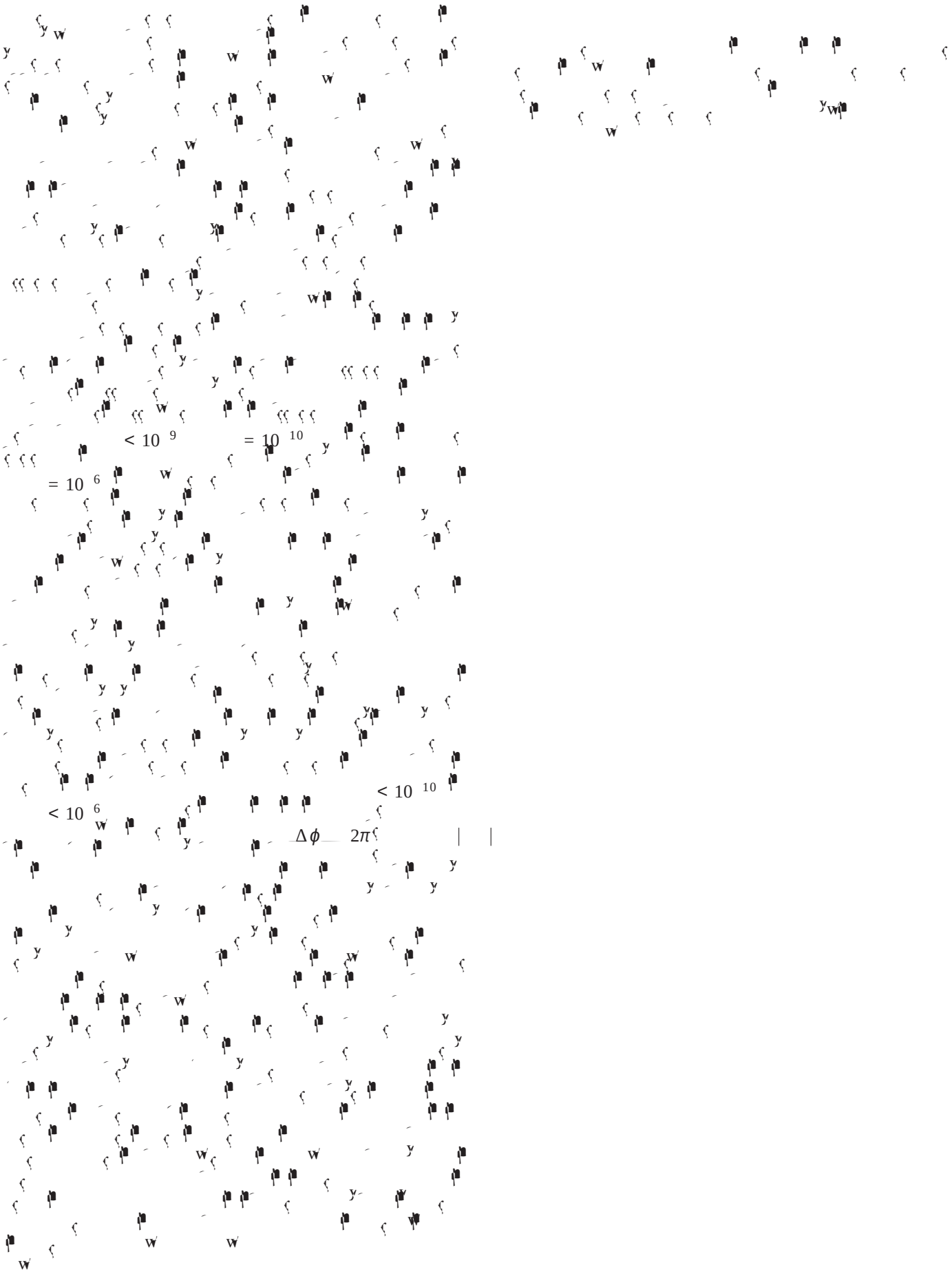
$t_{pre} = 832$

E_{us} ▶ 70%

$T_{DBA} = 200\,\mu$

E_{us} ▶ 99%

μ T_{DBA}


< 10 9
= 10 10
= 10 6
< 10 10
< 10 6
Δφ 2π