AVANTIX

Avancement Simulateur IQ

AVANTIX

Par branche

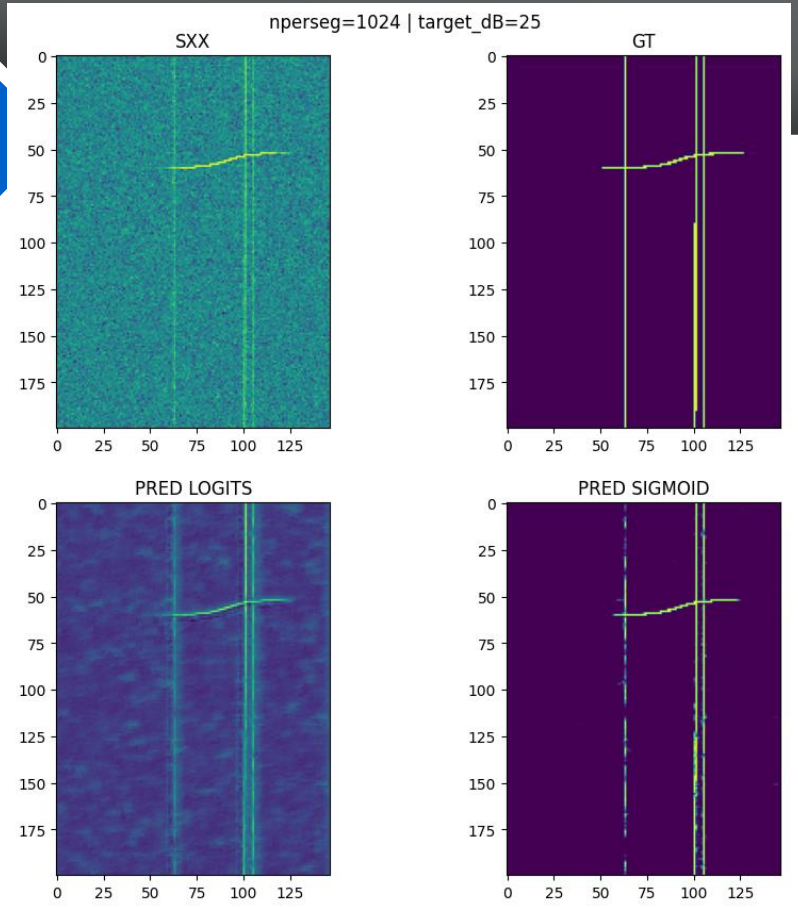
BT607

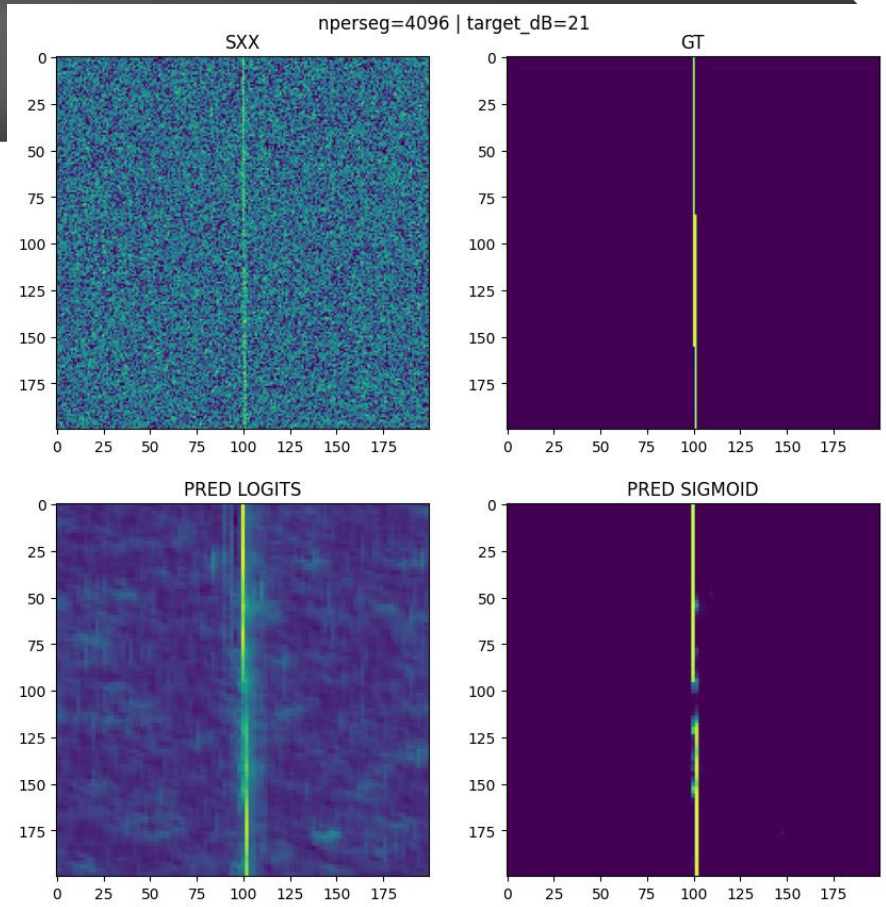
Création nouvelle bt avec threshold = 1dB

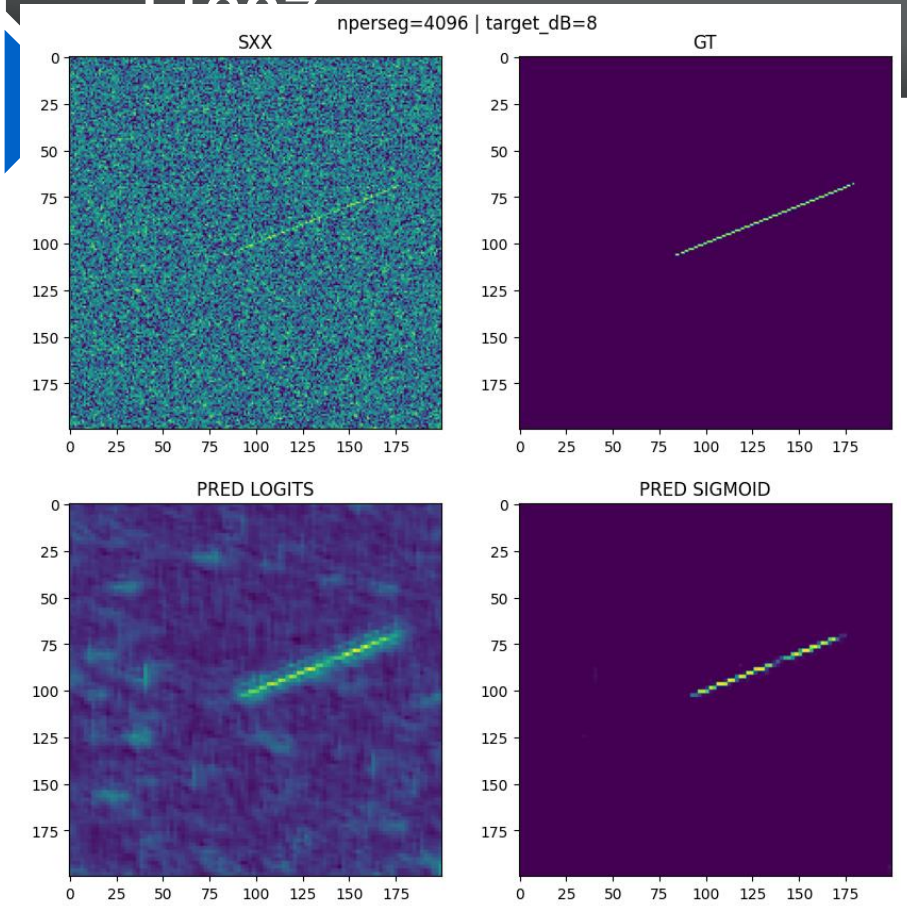
Utilisation des modèles entrainés sur bt603
Rappel des perfs des modèles entrainés sur bt603 →

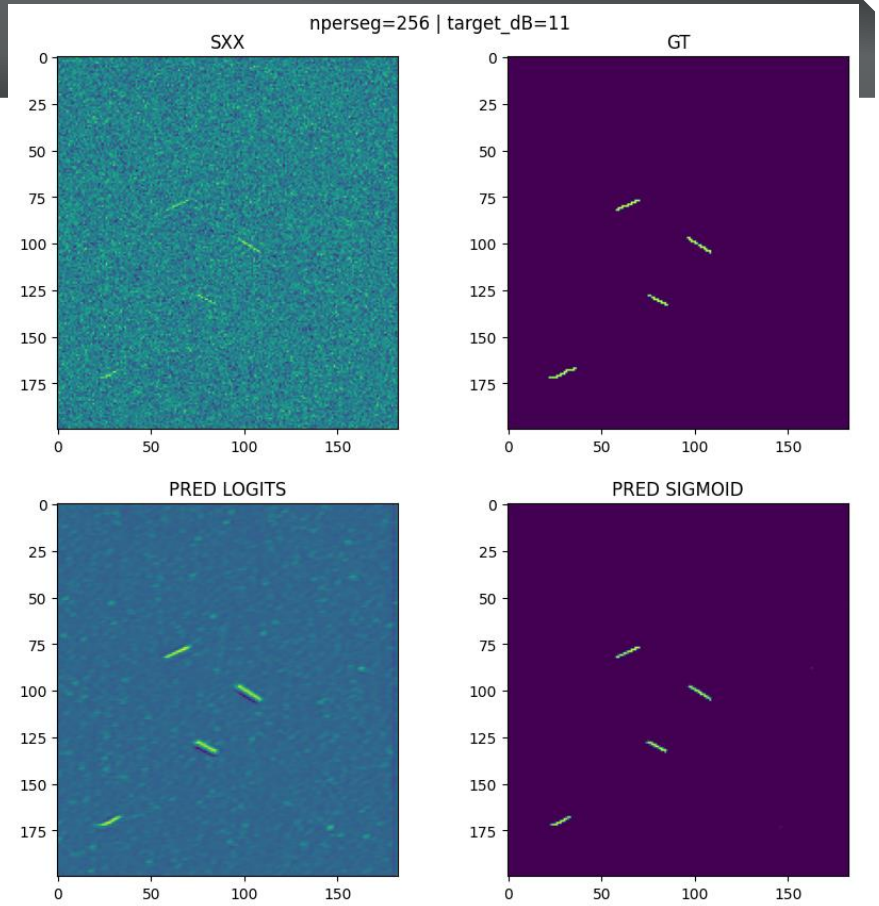
Inspection des sorties des branches pour construire masque final

nperseg	Nombre de couches	num_kernels (num_params)	PR-AUC (%)
256	6	4	97,6
		2	96,6
		1	84,1
512	6	4	97,0
		2	94,8
		1	87,4
1024	6	4	95,4
		2	91,3
		1	59,8
4096	6	4	96,2
		2	89,7
		1	77,7
16384	6	4	95,8
		2	86,3
		1	53,5
131072	6	4	96,8
		2	95,4
		1	90,6


nperseg=1024 | target_dB=25
SXX
GT
PRED LOGITS
PRED SIGMOID


nperseg=4096 | target_dB=21
SXX
GT
PRED LOGITS
PRED SIGMOID


nperseg=4096 | target_dB=8
SXX
GT
PRED LOGITS
PRED SIGMOID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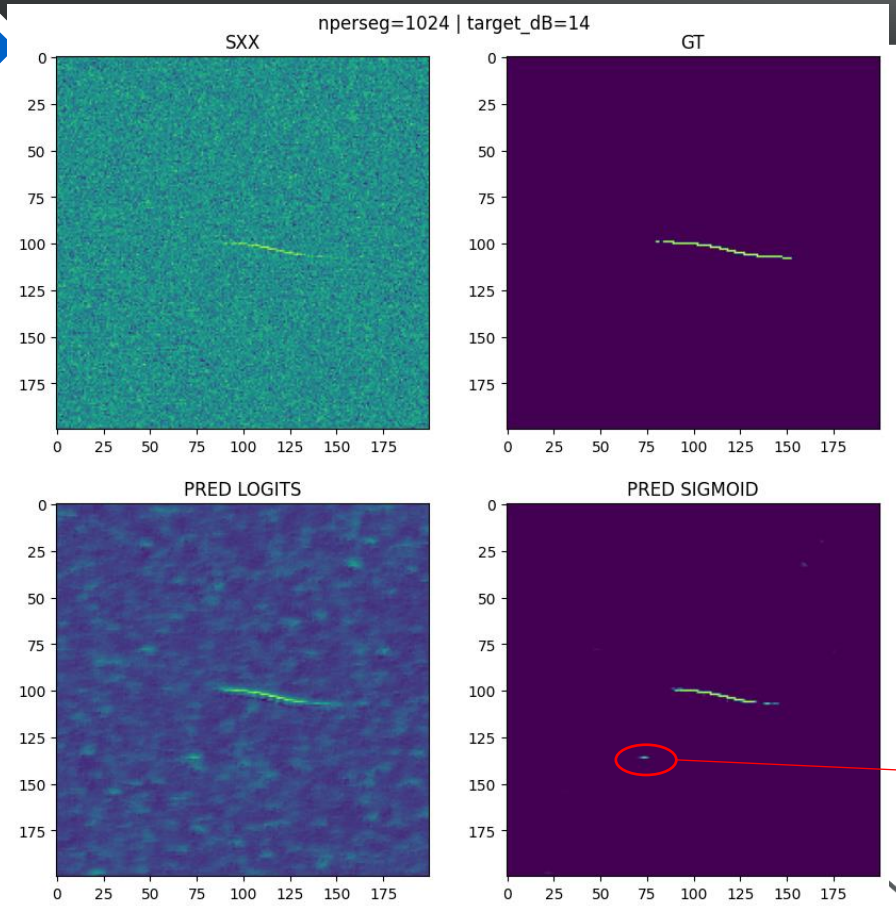
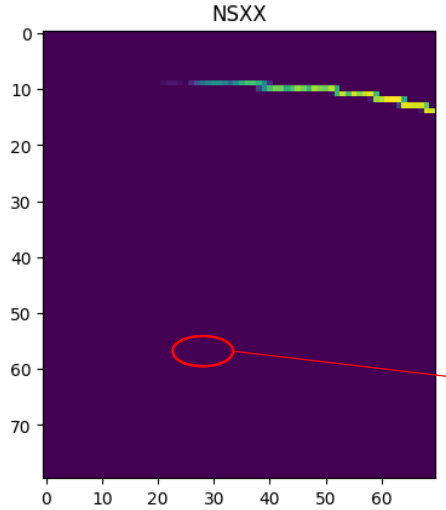
SXX
GT
PRED LOGITS
PRED SIGMOID

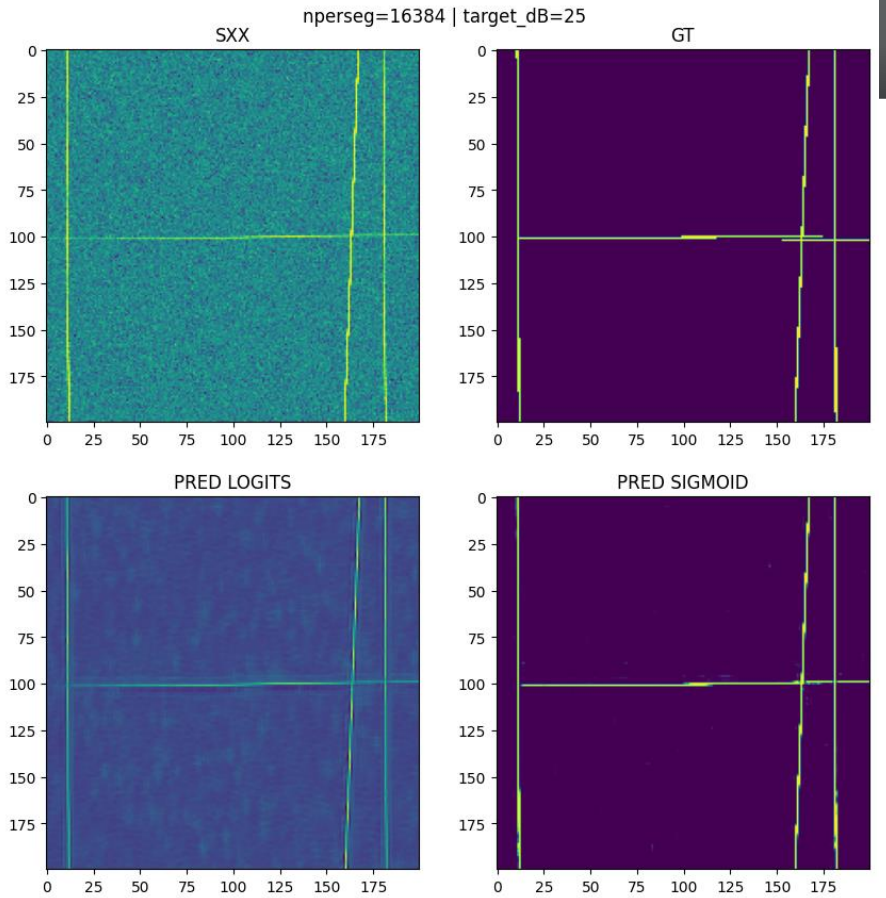
bt607





Faux positif

Valeur max = 0,8755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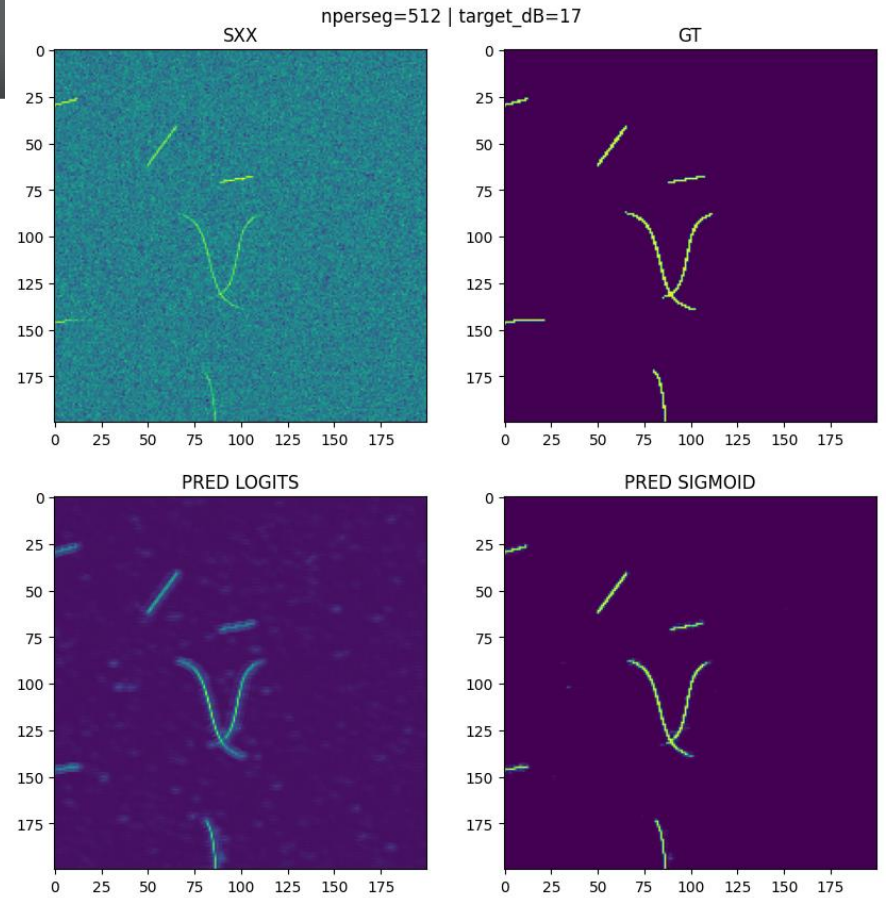
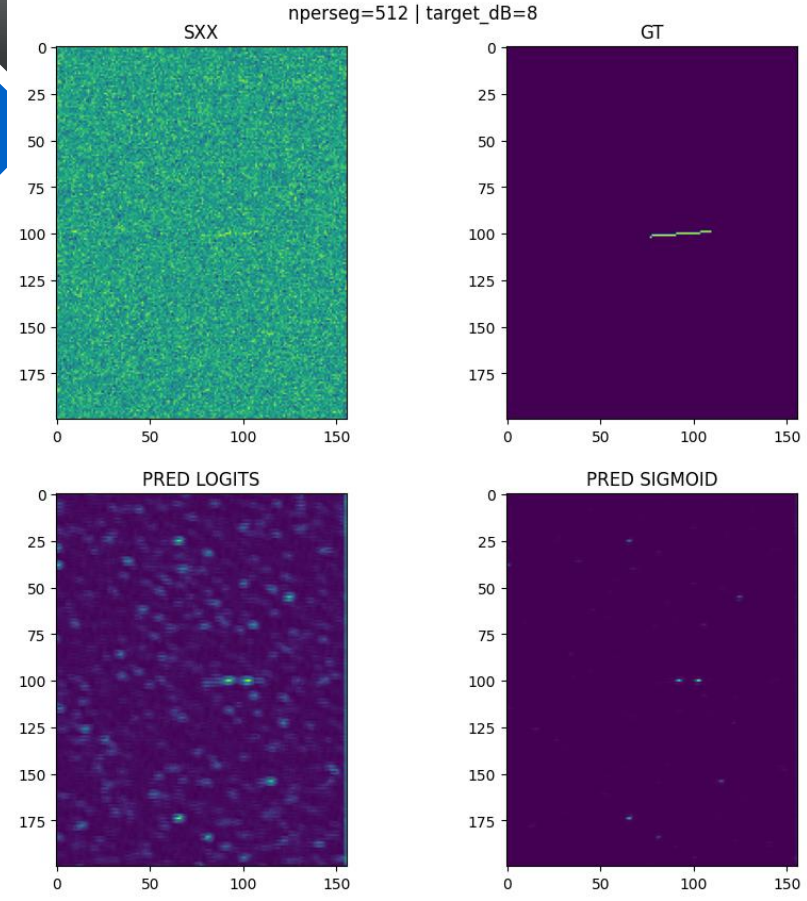
SXX
GT
PRED LOGITS
PRED SIGMOID


nperseg=512 | target_dB=17
SXX
GT
PRED LOGITS
PRED SIGMOID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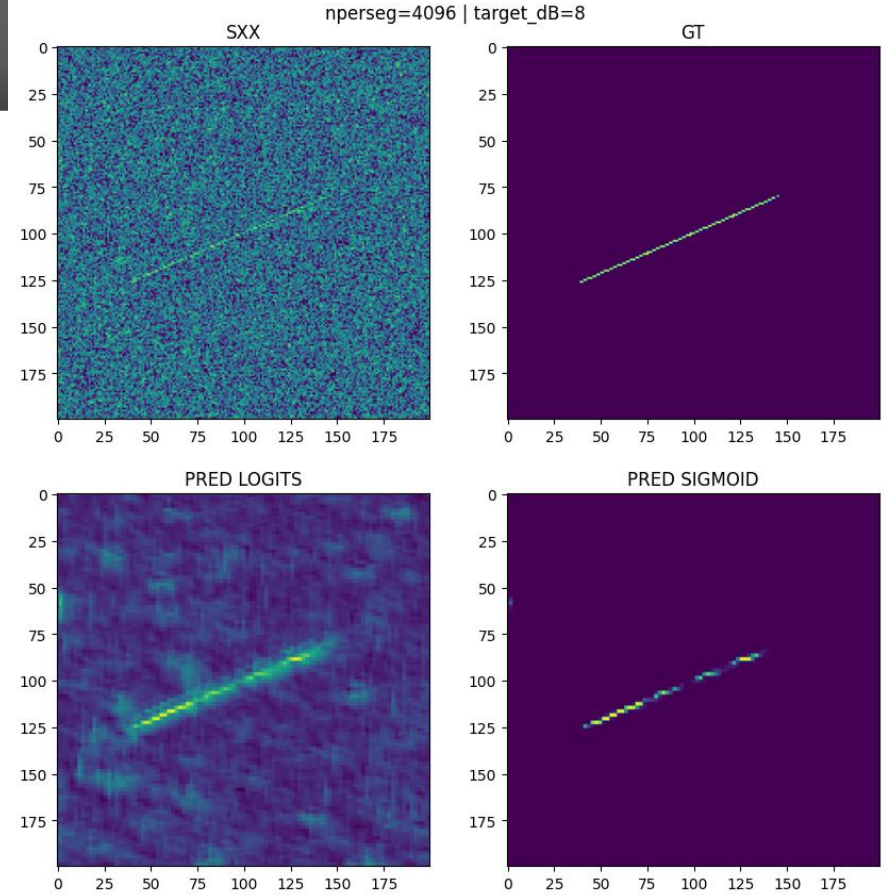
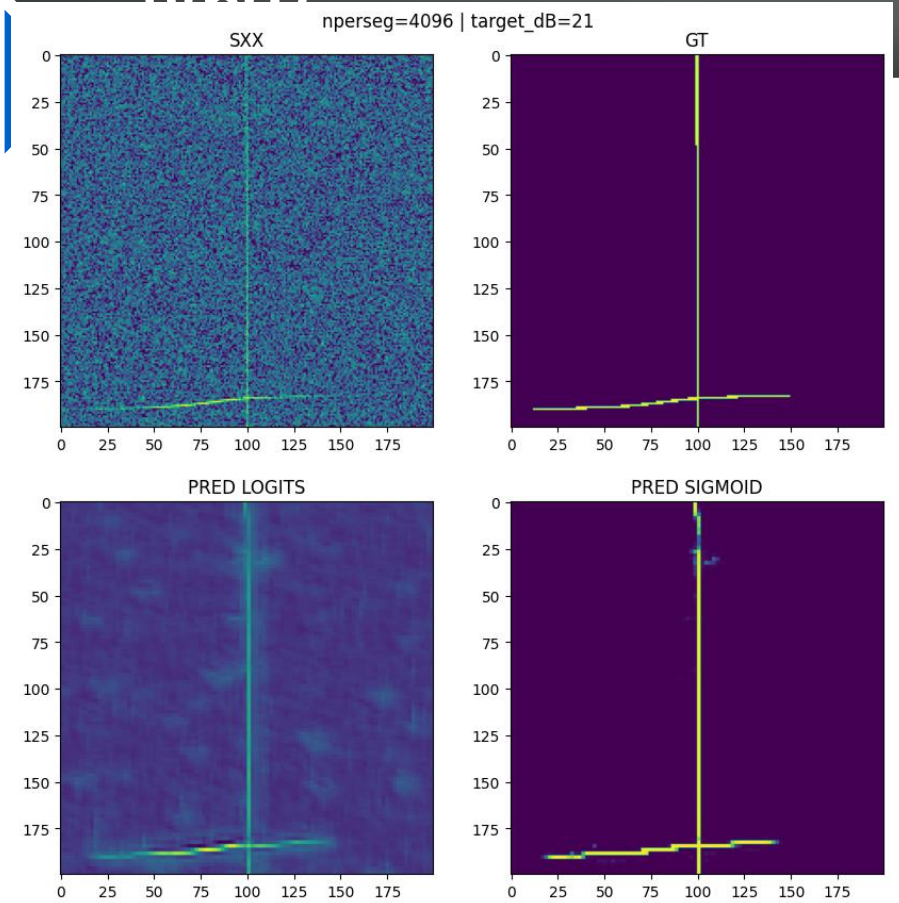
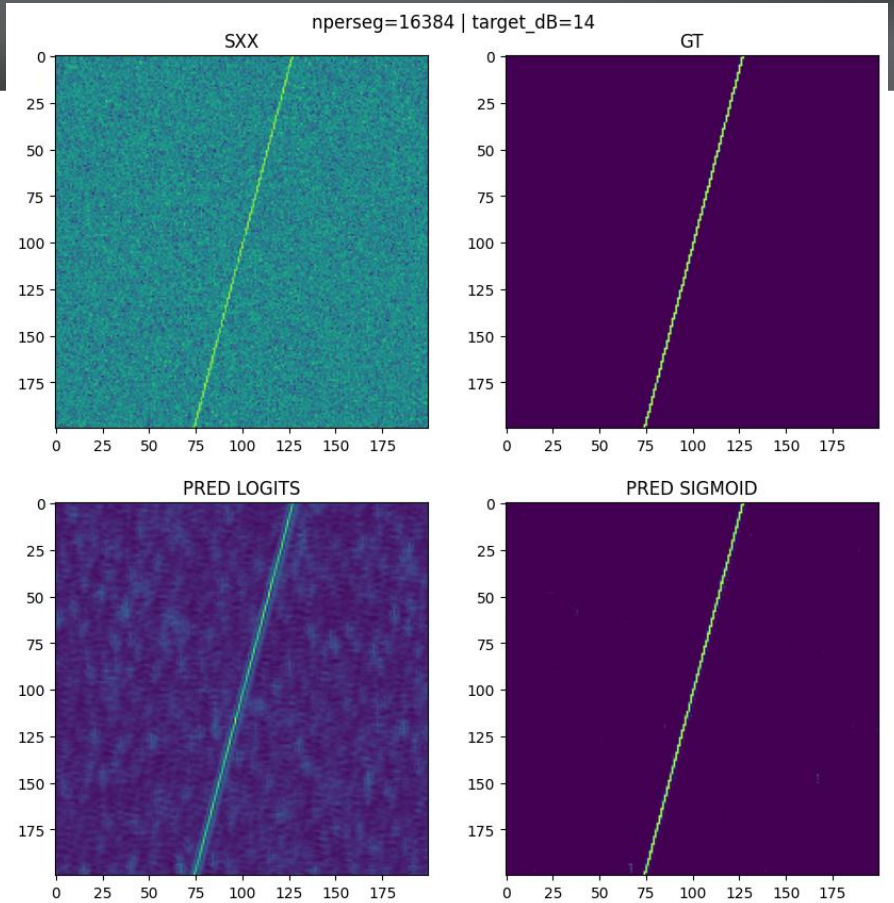
SXX
GT
PRED LOGITS
PRED SIGMOID


nperseg=4096 | target_dB=8
SXX
GT
PRED LOGITS
PRED SIGMOID

bt607


nperseg=4096 | target_dB=21
SXX
GT
PRED LOGITS
PRED SIGMOID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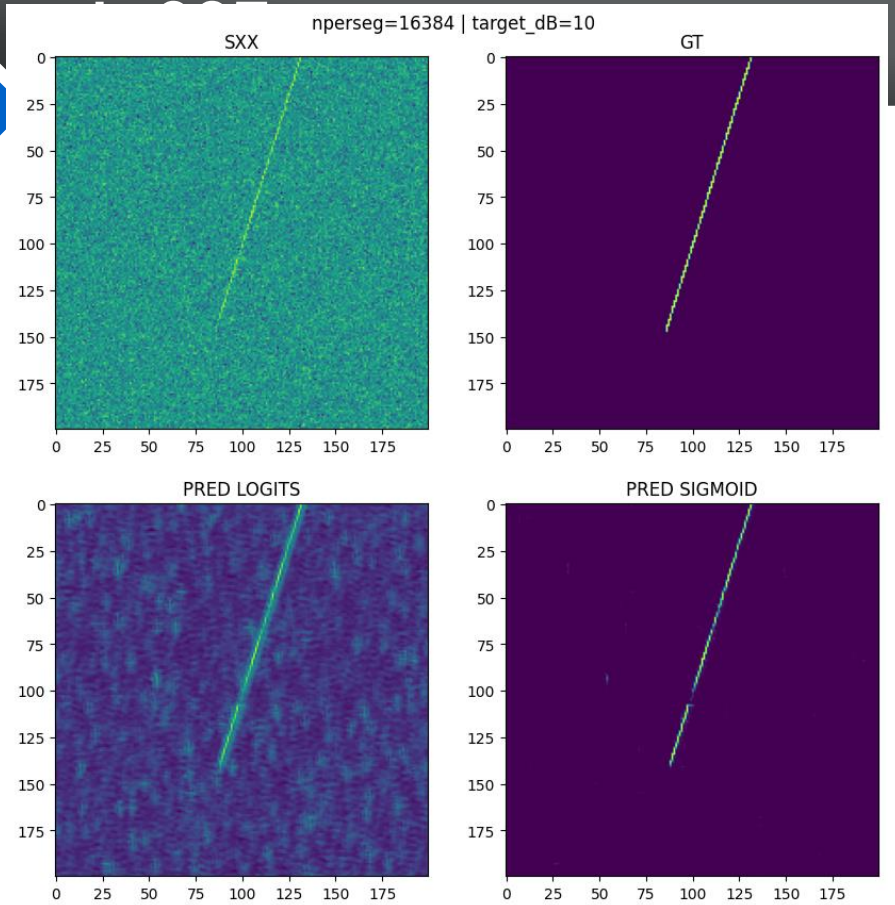
SXX
GT
PRED LOGITS
PRED SIGMOID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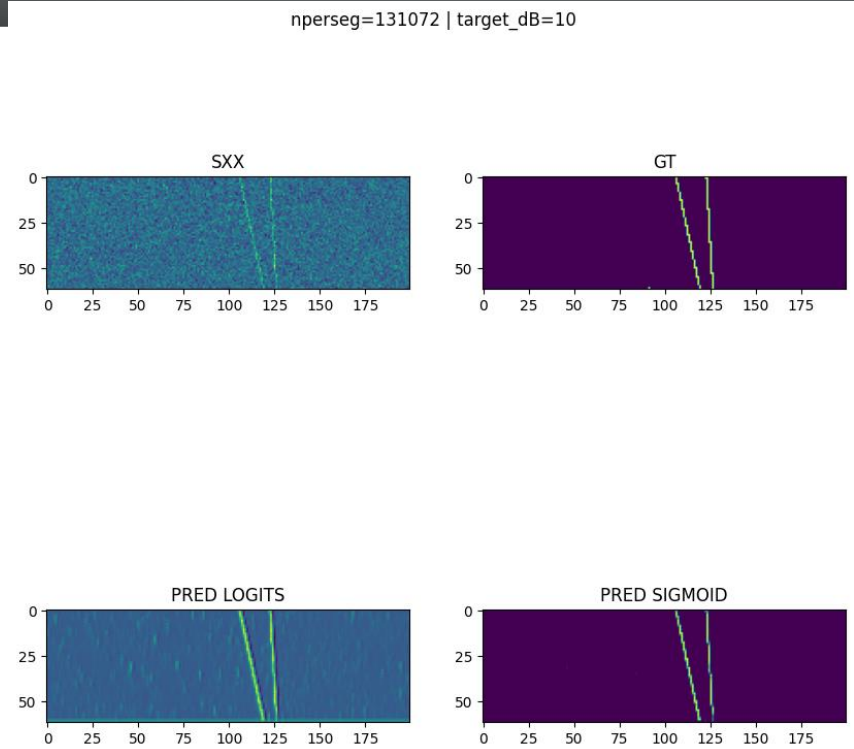
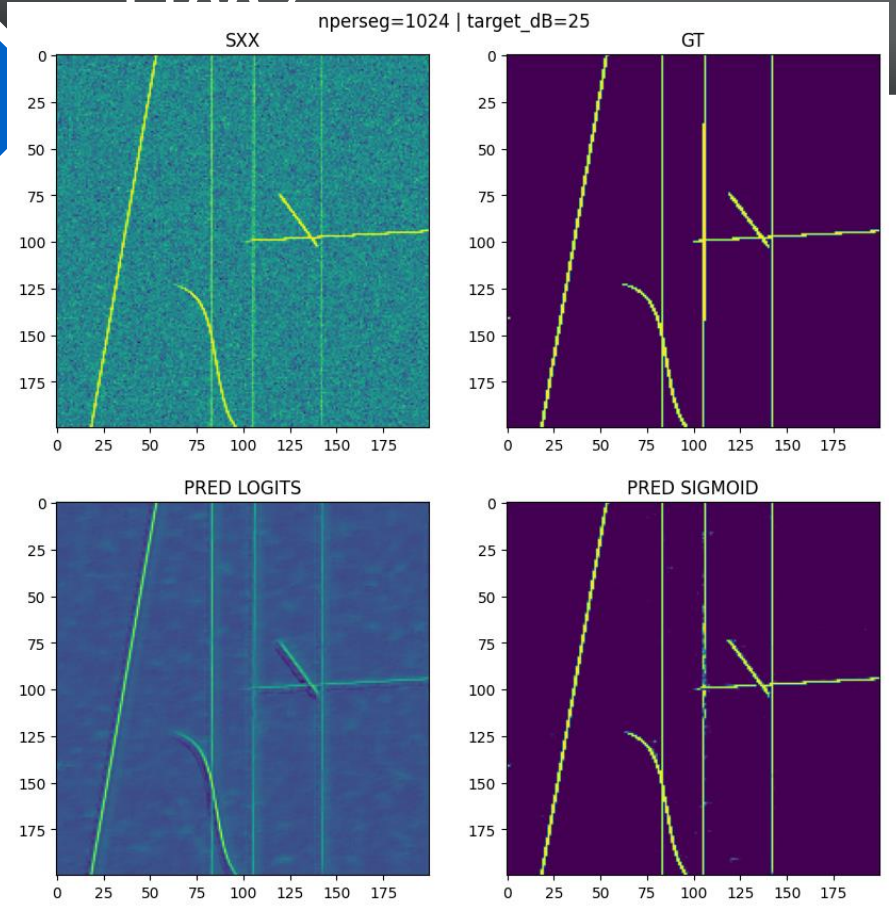
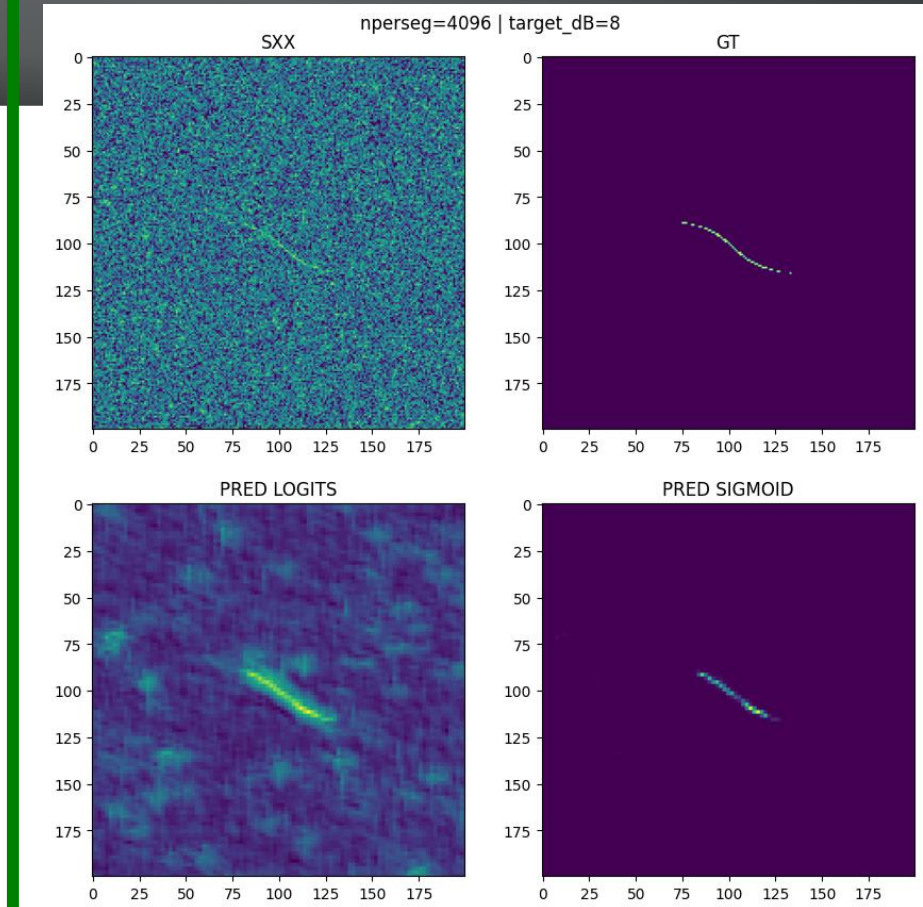
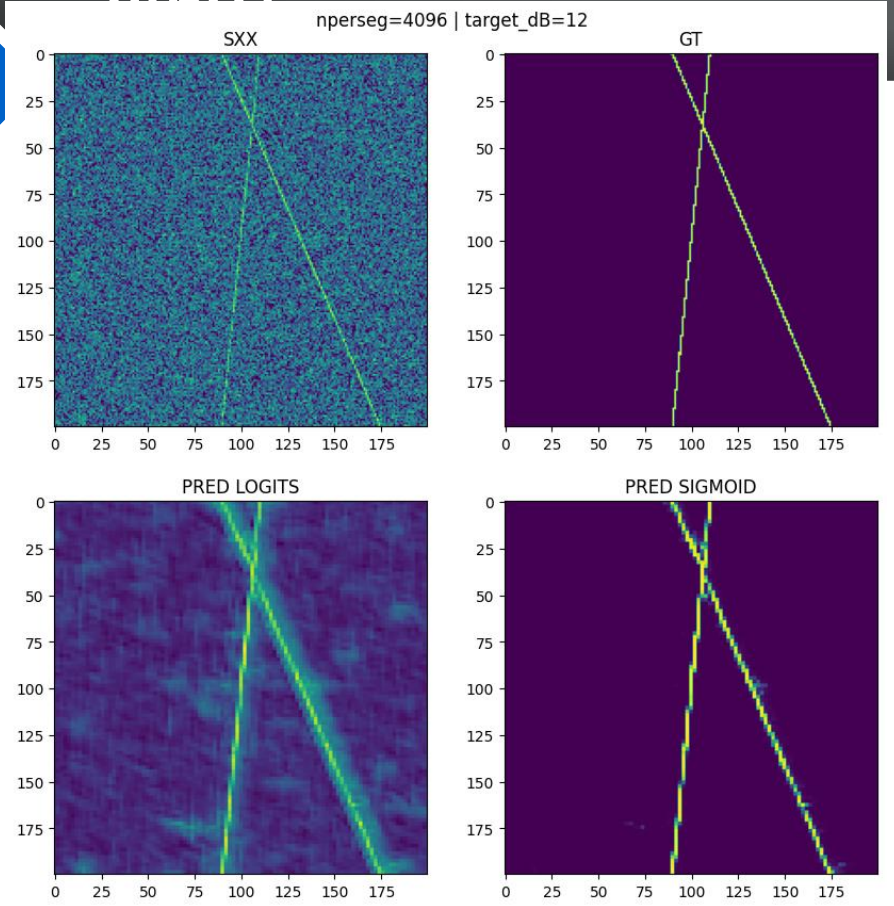
SXX
GT
PRED LOGITS
PRED SIGMOID

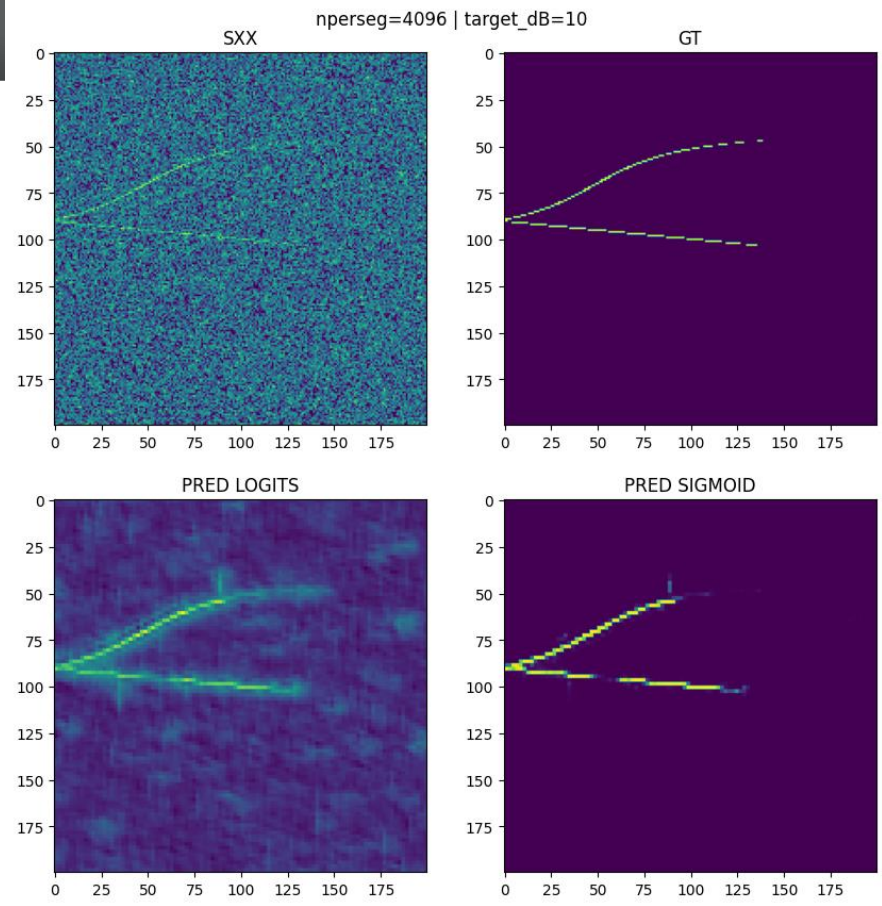

nperseg=131072 | target_dB=10
SXX
GT
PRED LOGITS
PRED SIGMOID

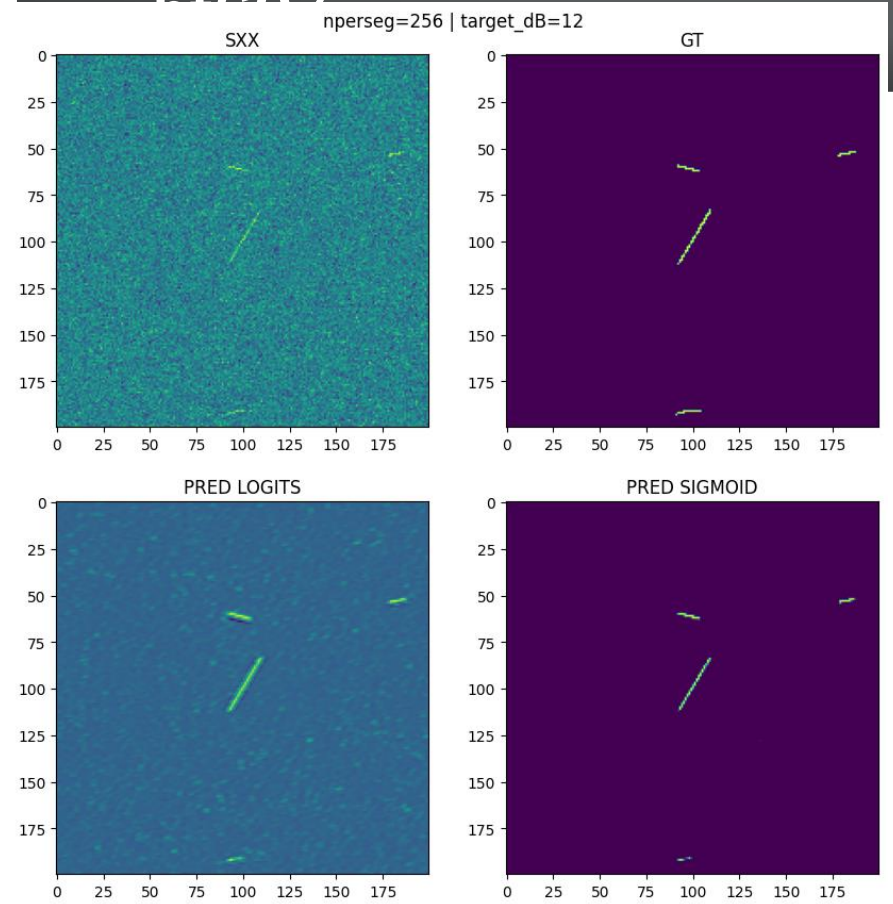

nperseg=1024 | target_dB=25
SXX
GT
PRED LOGITS
PRED SIGMOID

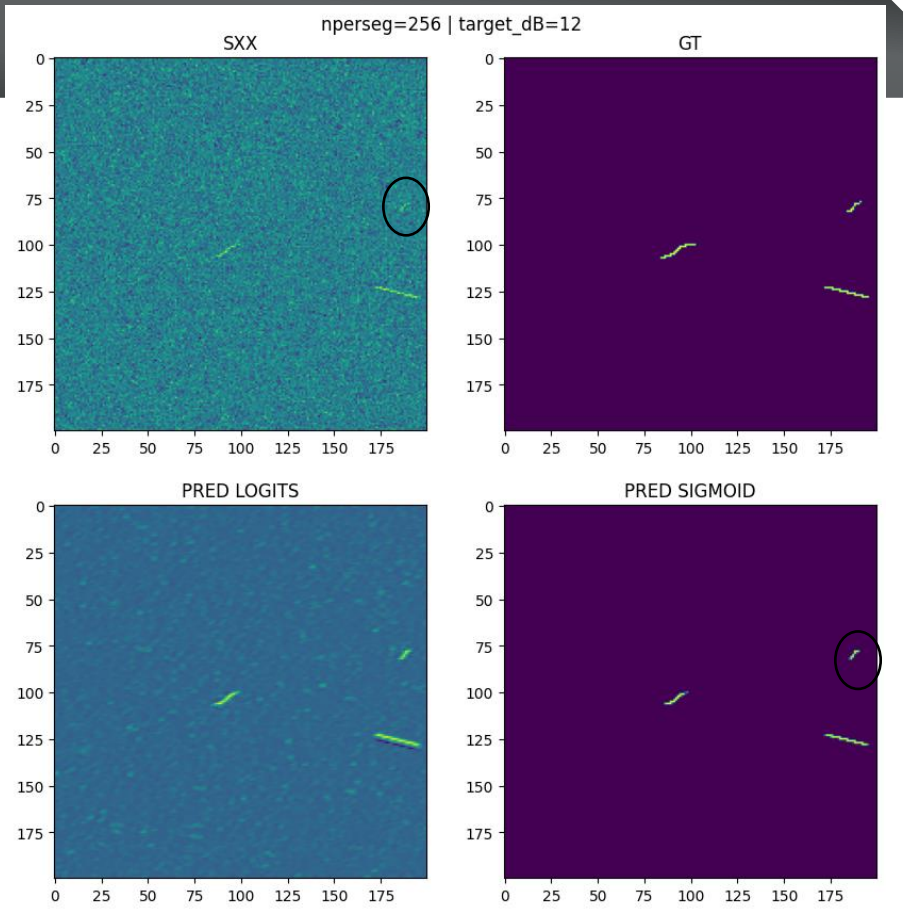

nperseg=4096 | target_dB=8
SXX
GT
PRED LOGITS
PRED SIGMOID

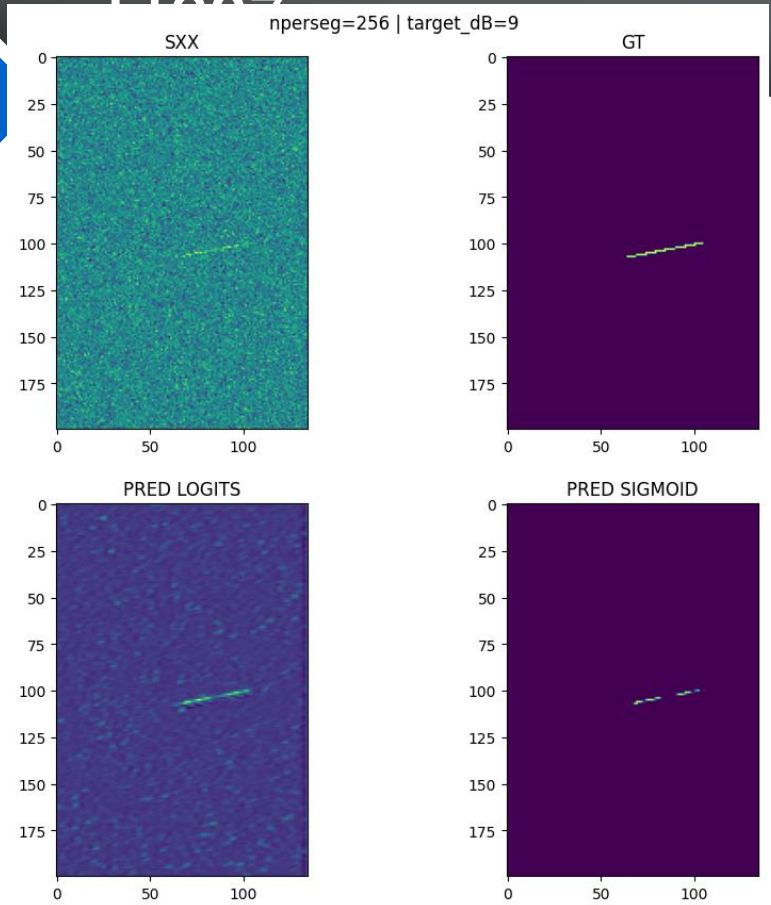
bt607

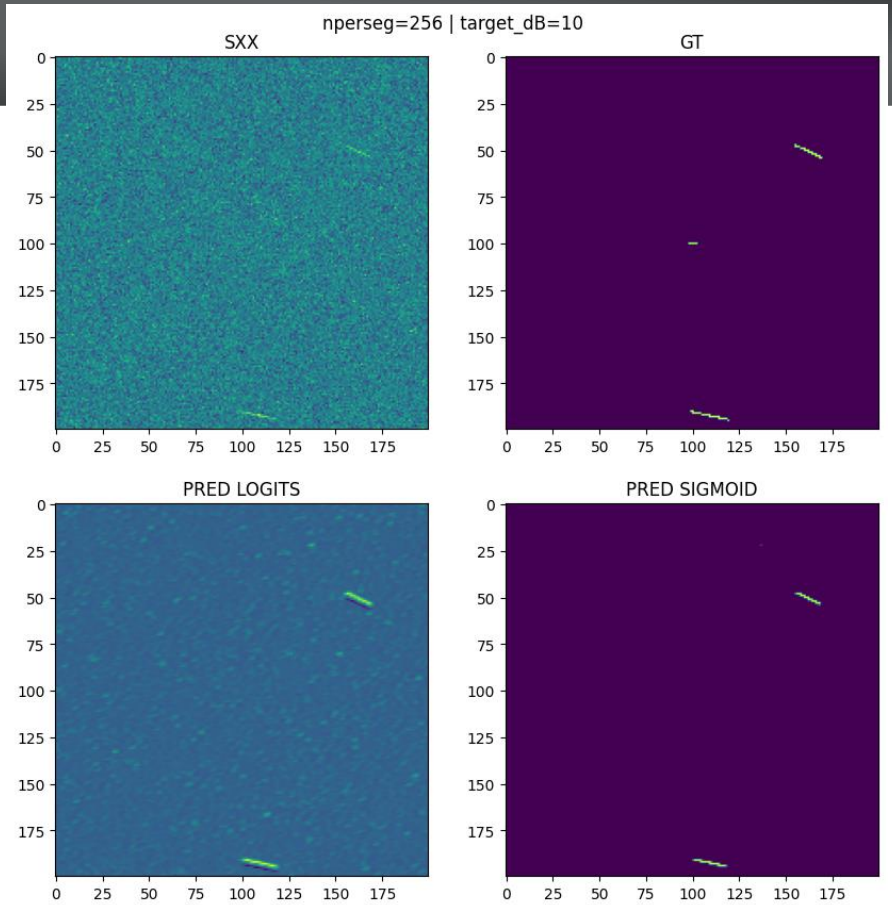

nperseg=4096 | target_dB=12
SXX
GT
PRED LOGITS
PRED SIGMOID


nperseg=4096 | target_dB=10
SXX
GT
PRED LOGITS
PRED SIGMOID

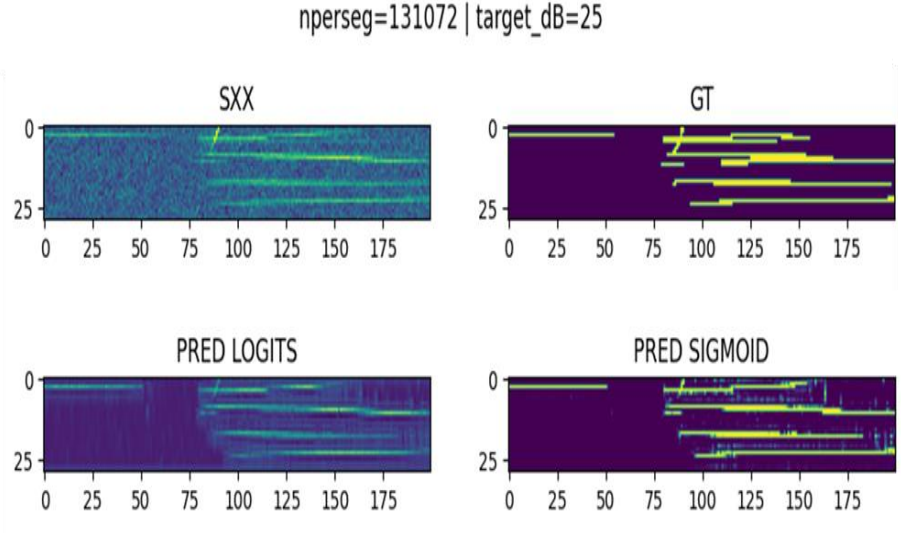

nperseg=256 | target_dB=12
SXX
GT
PRED LOGITS
PRED SIGMOID

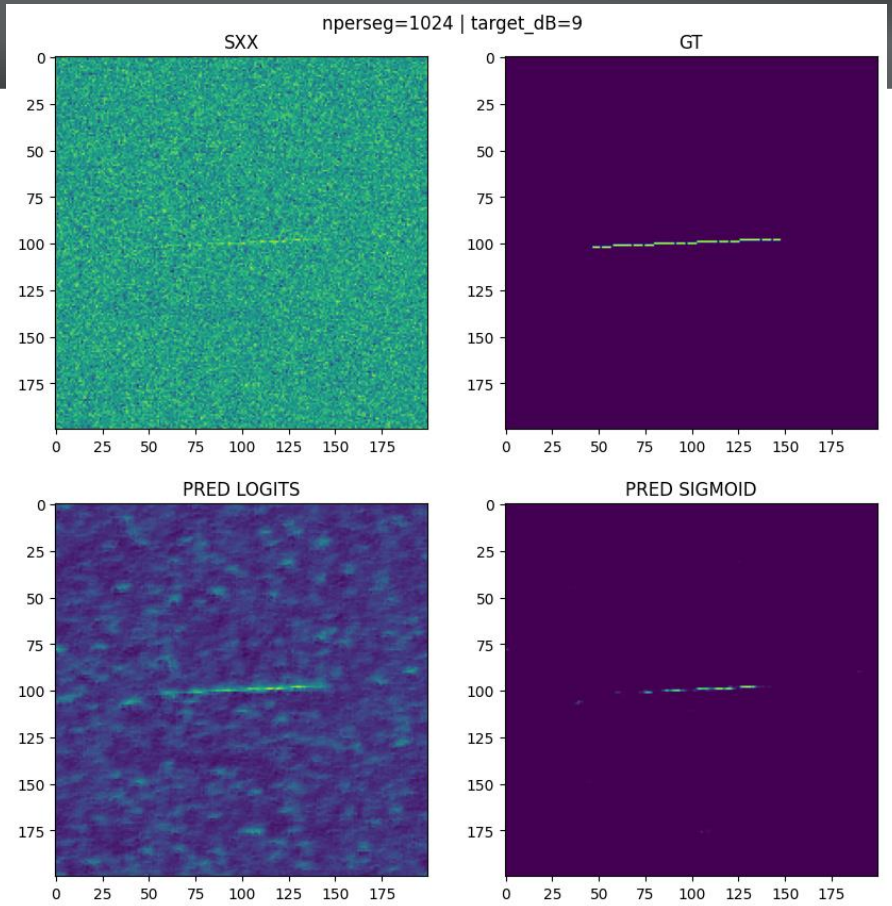

nperseg=256 | target_dB=12
SXX
GT
PRED LOGITS
PRED SIGMOID


nperseg=256 | target_dB=9
SXX
GT
PRED LOGITS
PRED SIGMOID


nperseg=256 | target_dB=10
SXX
GT
PRED LOGITS
PRED SIGMOID

bt607

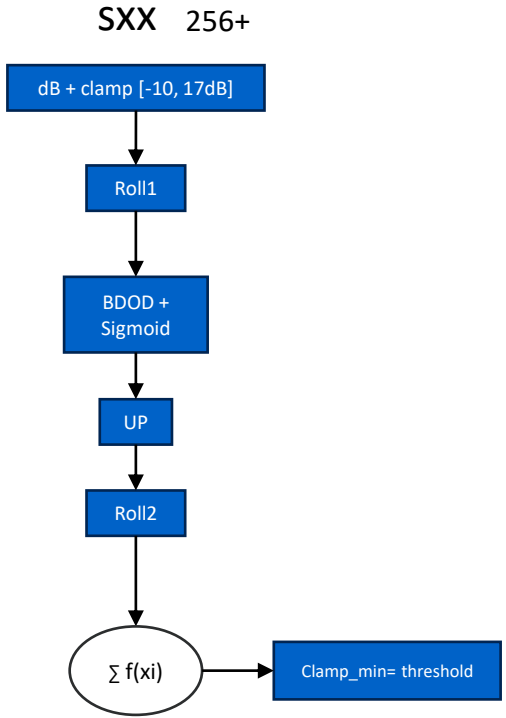

nperseg=131072 | target_dB=25
SXX
GT
PRED LOGITS
PRED SIGMOID

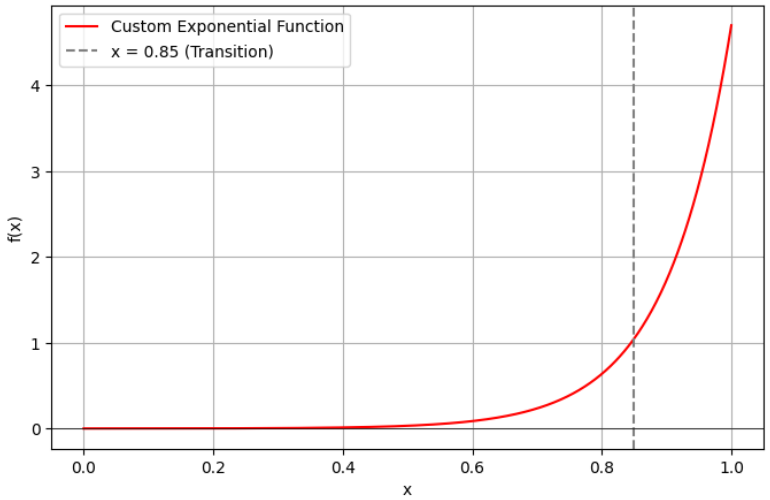

nperseg=1024 | target_dB=9
SXX
GT
PRED LOGITS
PRED SIGMOID

bt607

TODO Faire une BT où sur chaque nperseg seules les impulsions correspondant à son nperseg opt sont présentes

Fusion des branches : Création de l'input



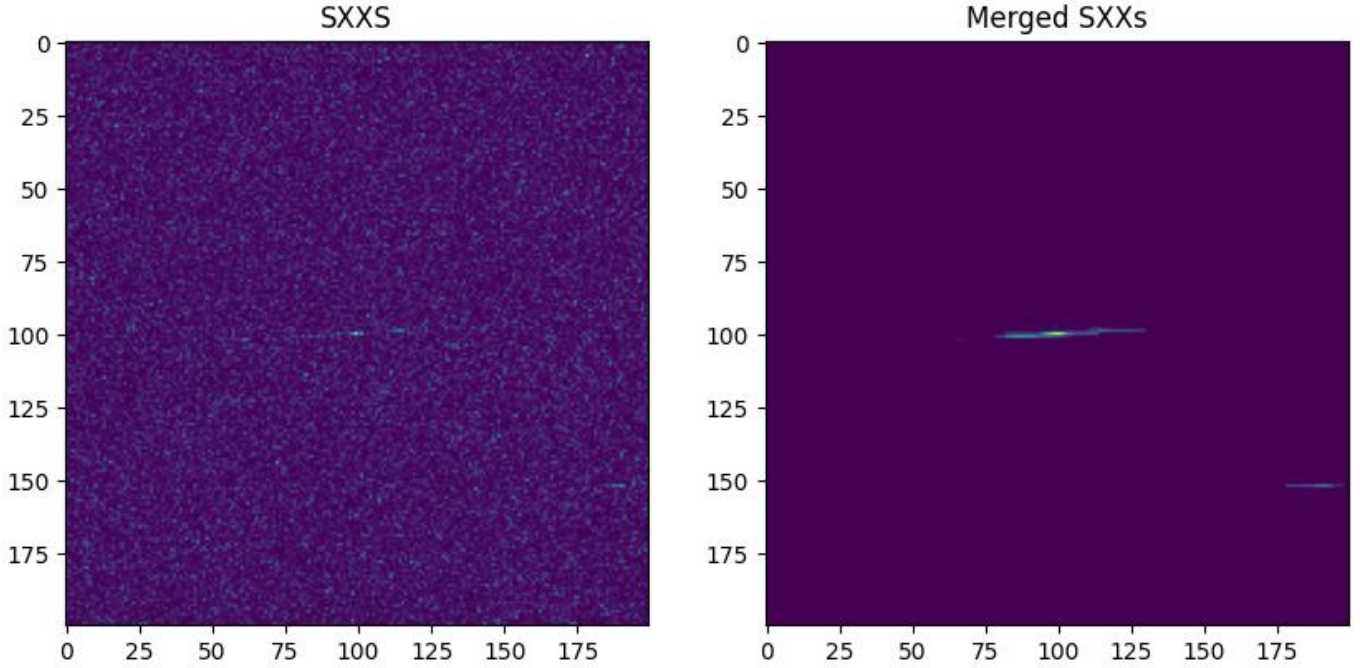


Rechercher d'une fct qui favorise la sortie du nperseg optimal

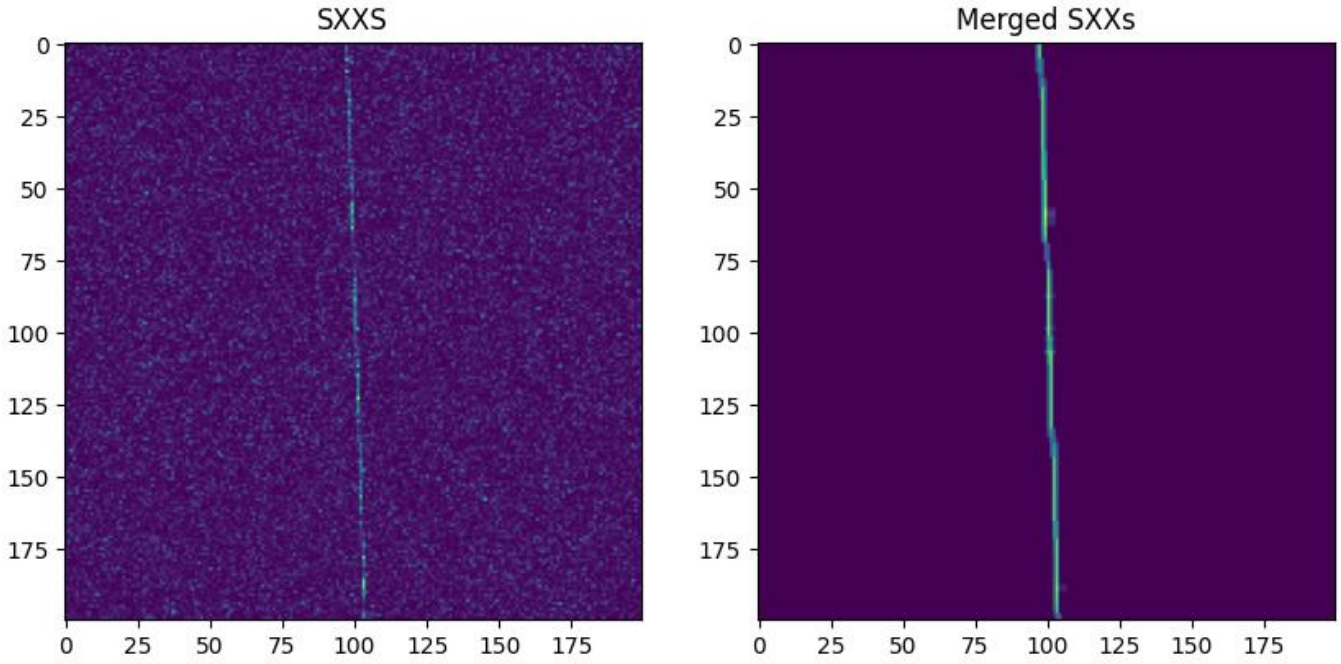
$$f(t) = a * \left(e^{b*(t-c)} - e^{-b*c}\right)$$

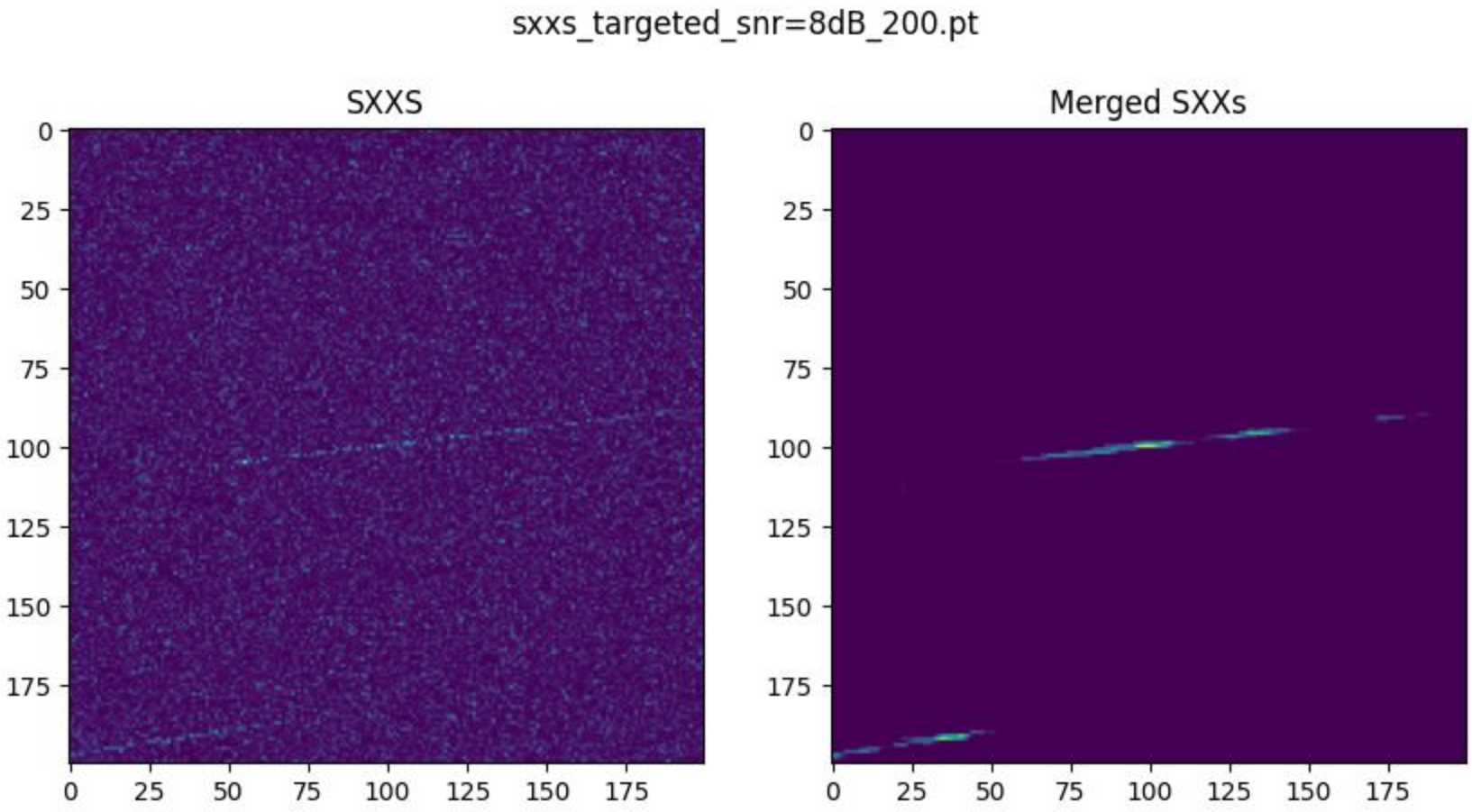
Avec $a = \frac{4{,}7}{e^{b*(1-c)} - e^{-b*c}}$, $b = 10$, $c = 0{,}85$

sxxs_targeted_snr=10dB_205.pt

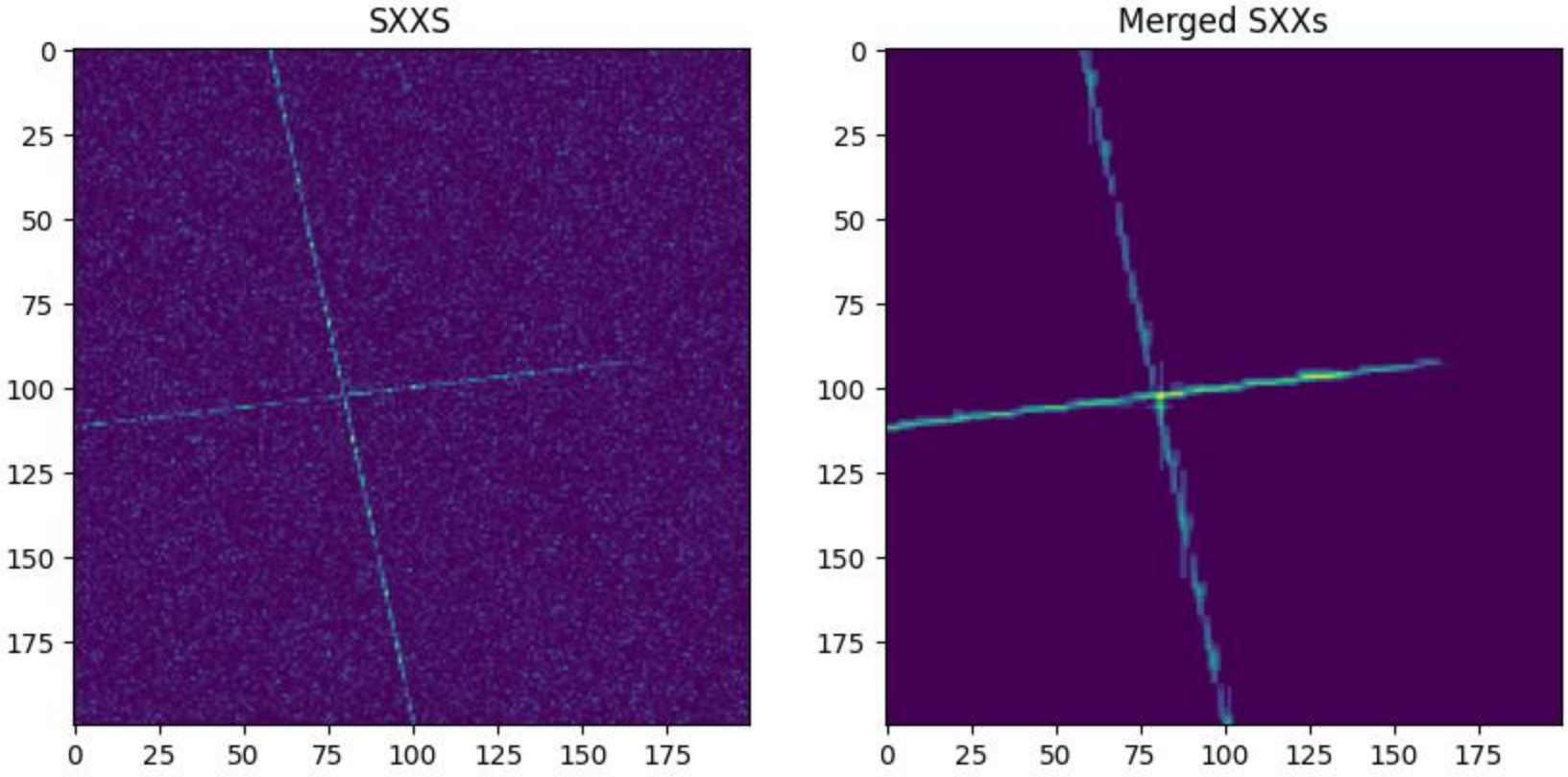


sxxs_targeted_snr=15dB_214.pt

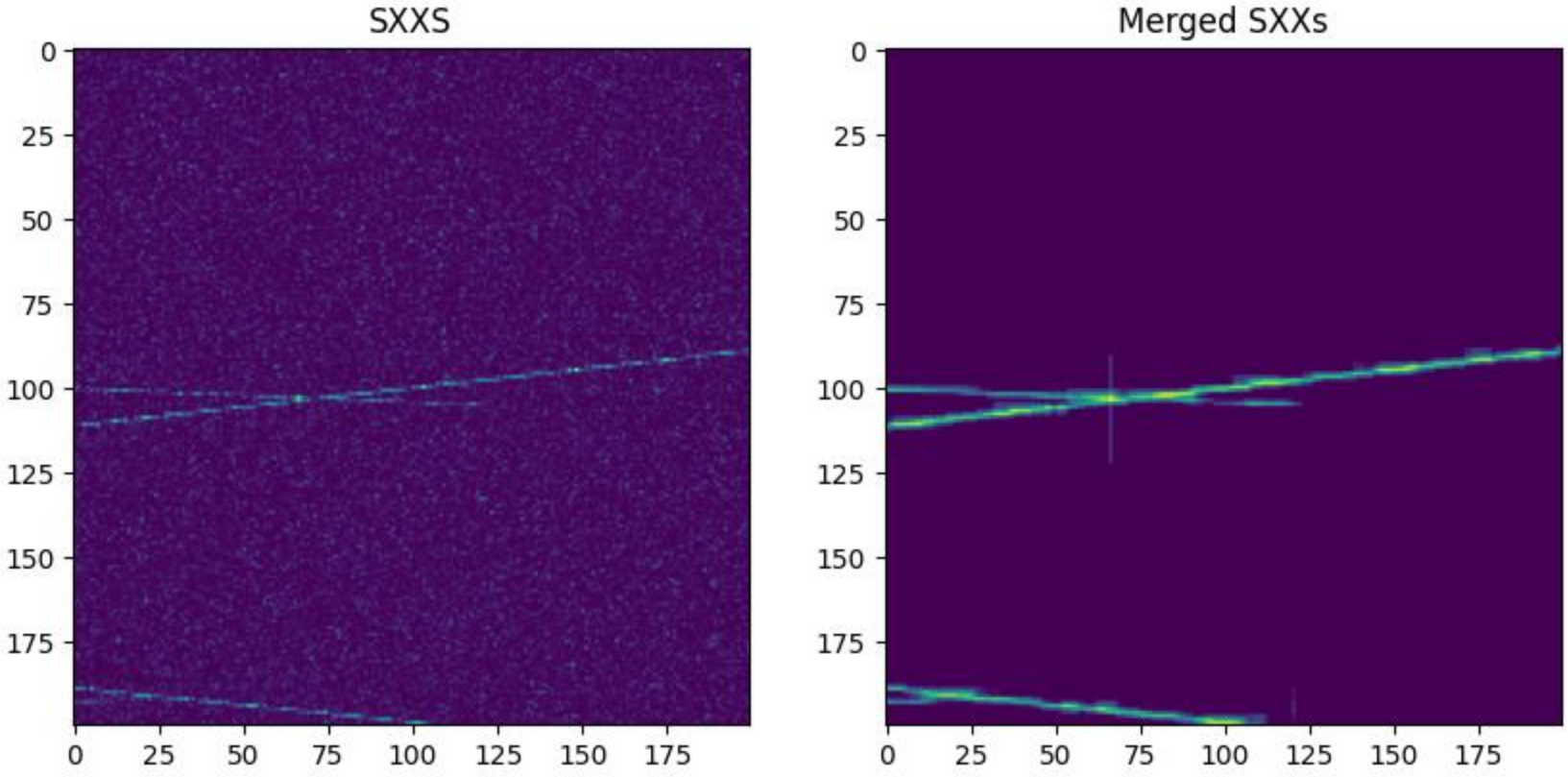



sxxs_targeted_snr=8dB_200.pt
SXXS
Merged SXXs
0
25
50
75
100
125
150
175

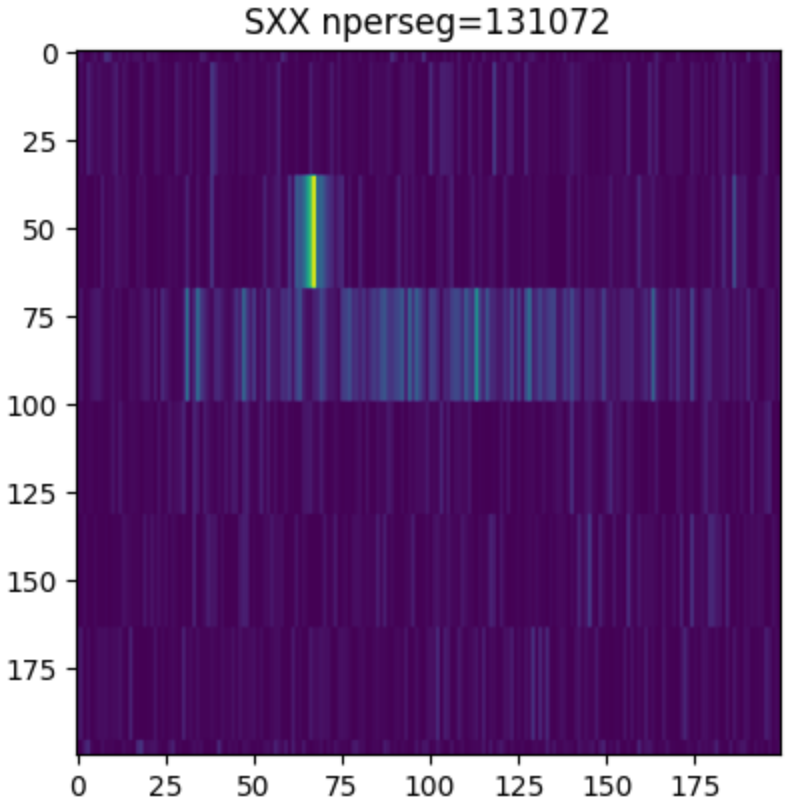
sxxs_targeted_snr=12dB_208.pt

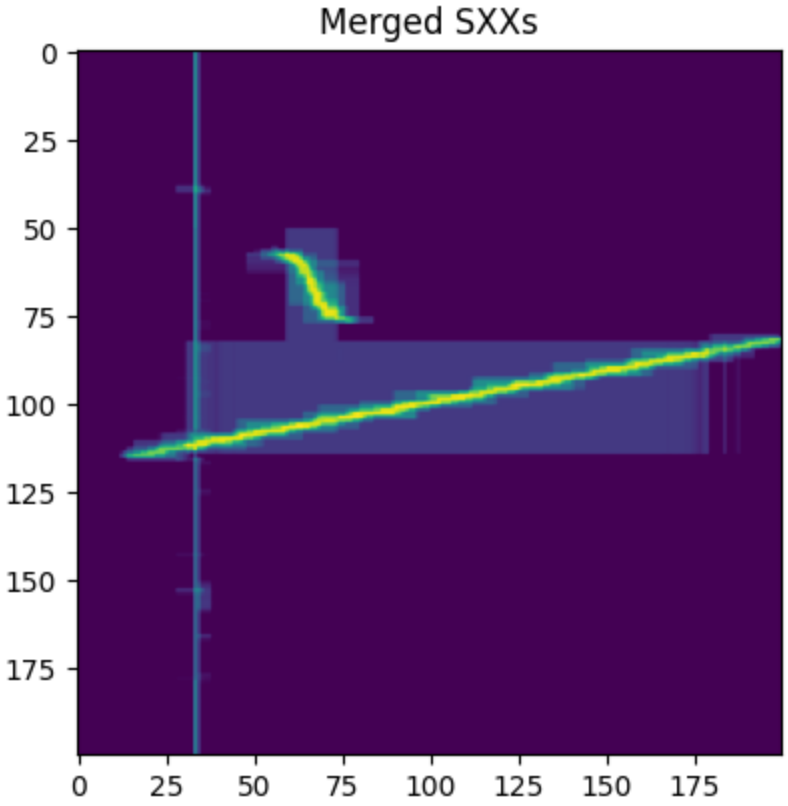


sxxs_targeted_snr=14dB_213.pt

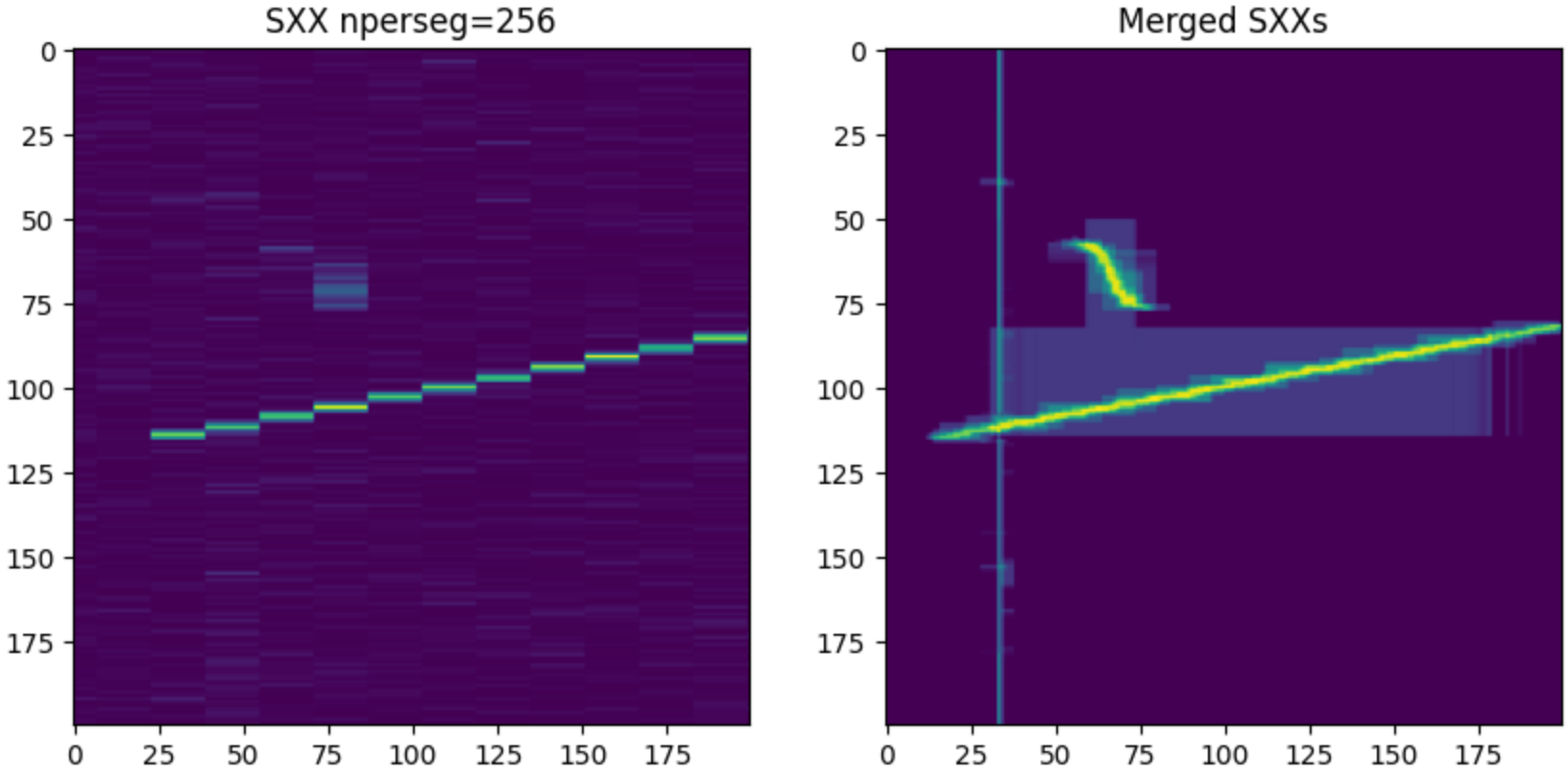


sxxs_targeted_snr=25dB_205.pt

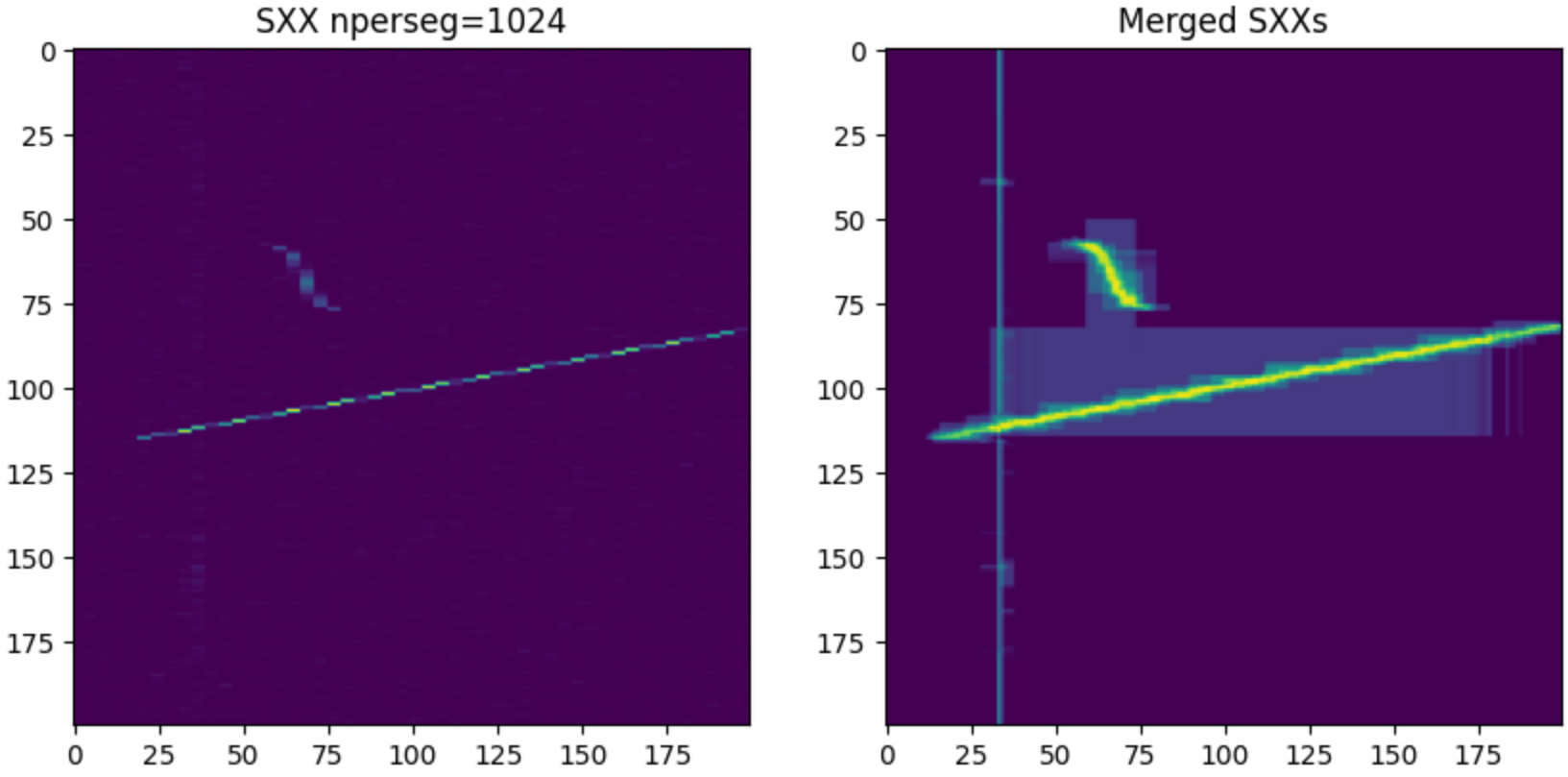




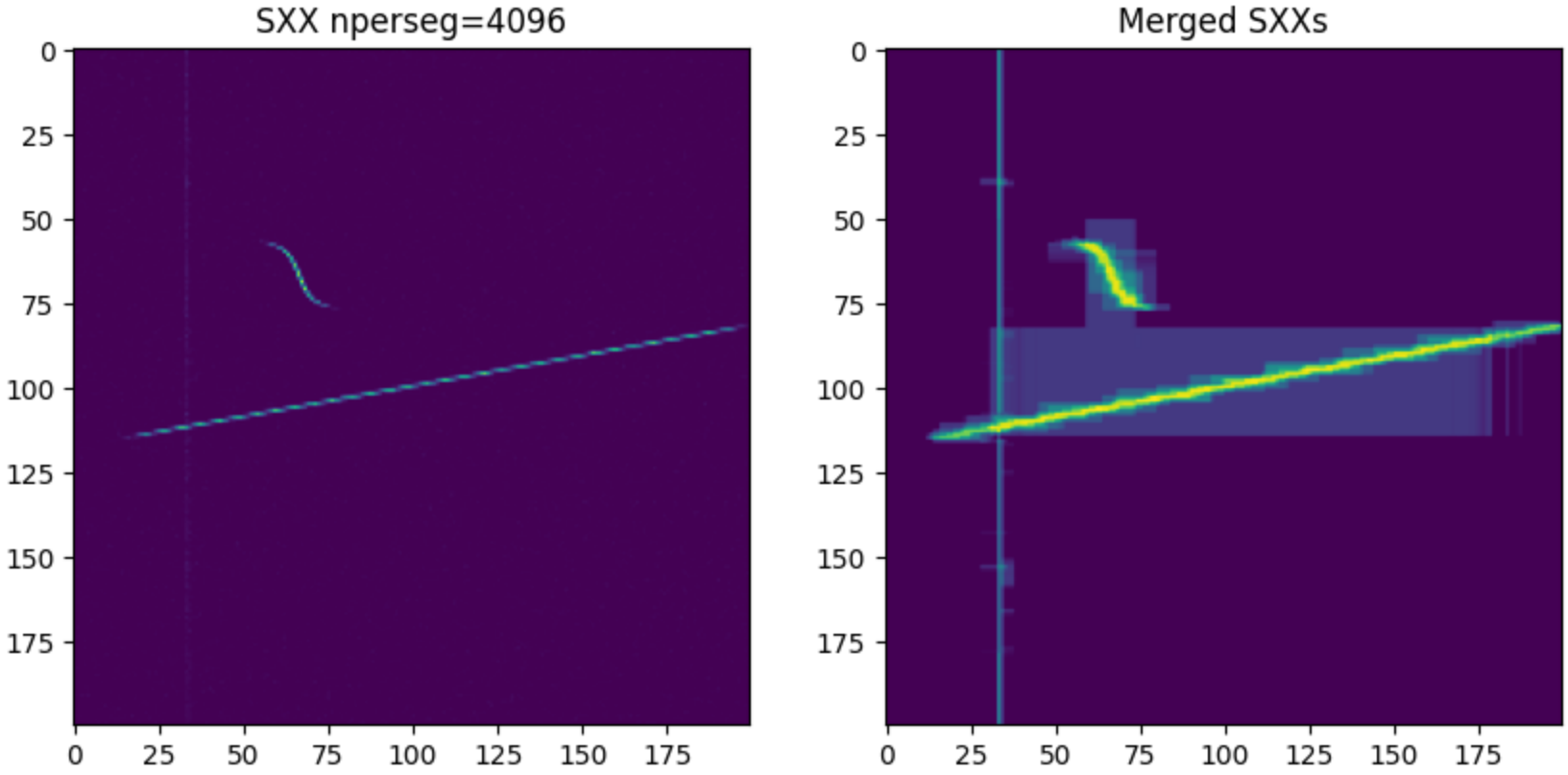
sxxs_targeted_snr=25dB_205.pt



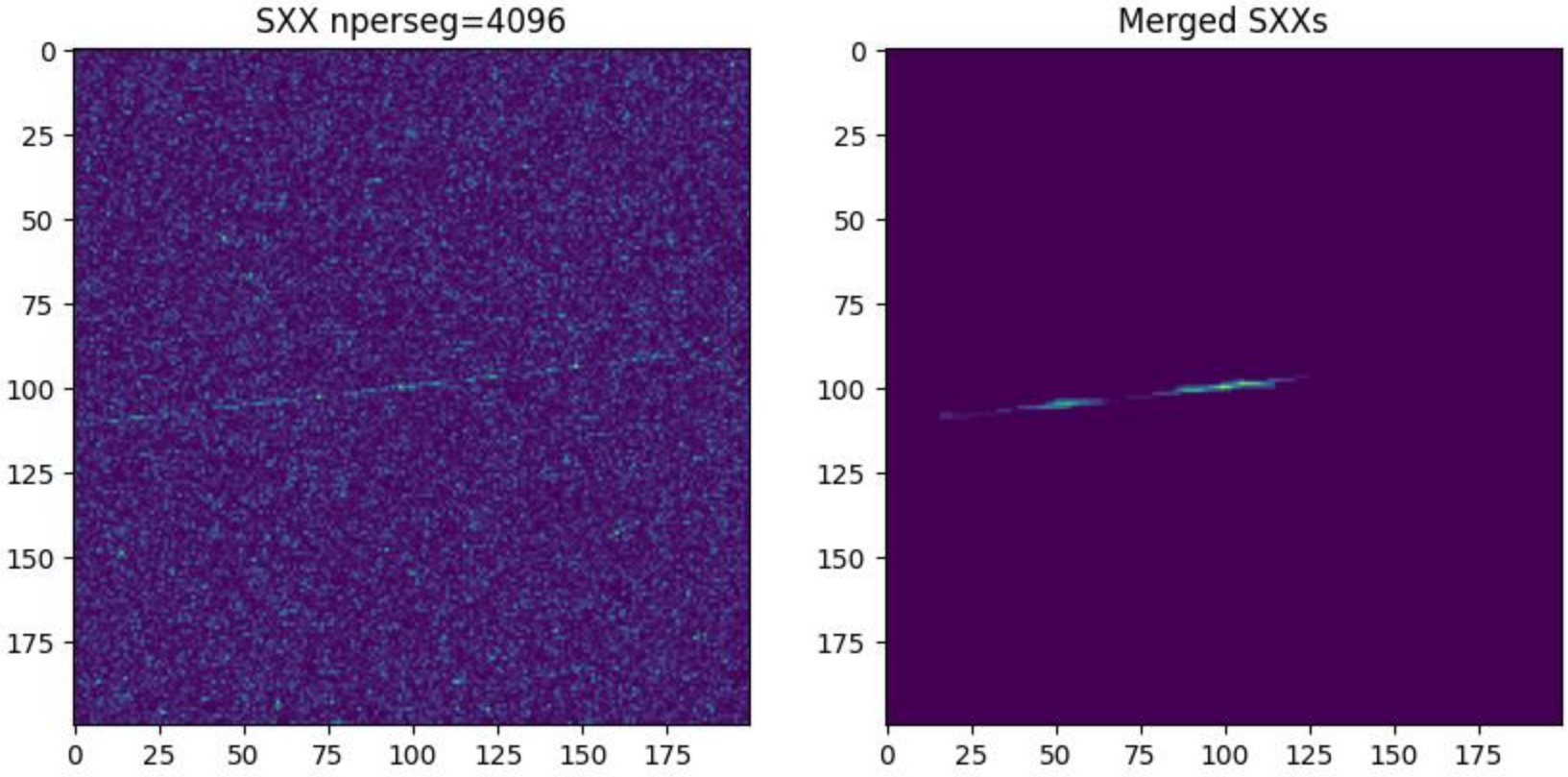
sxxs_targeted_snr=25dB_205.pt



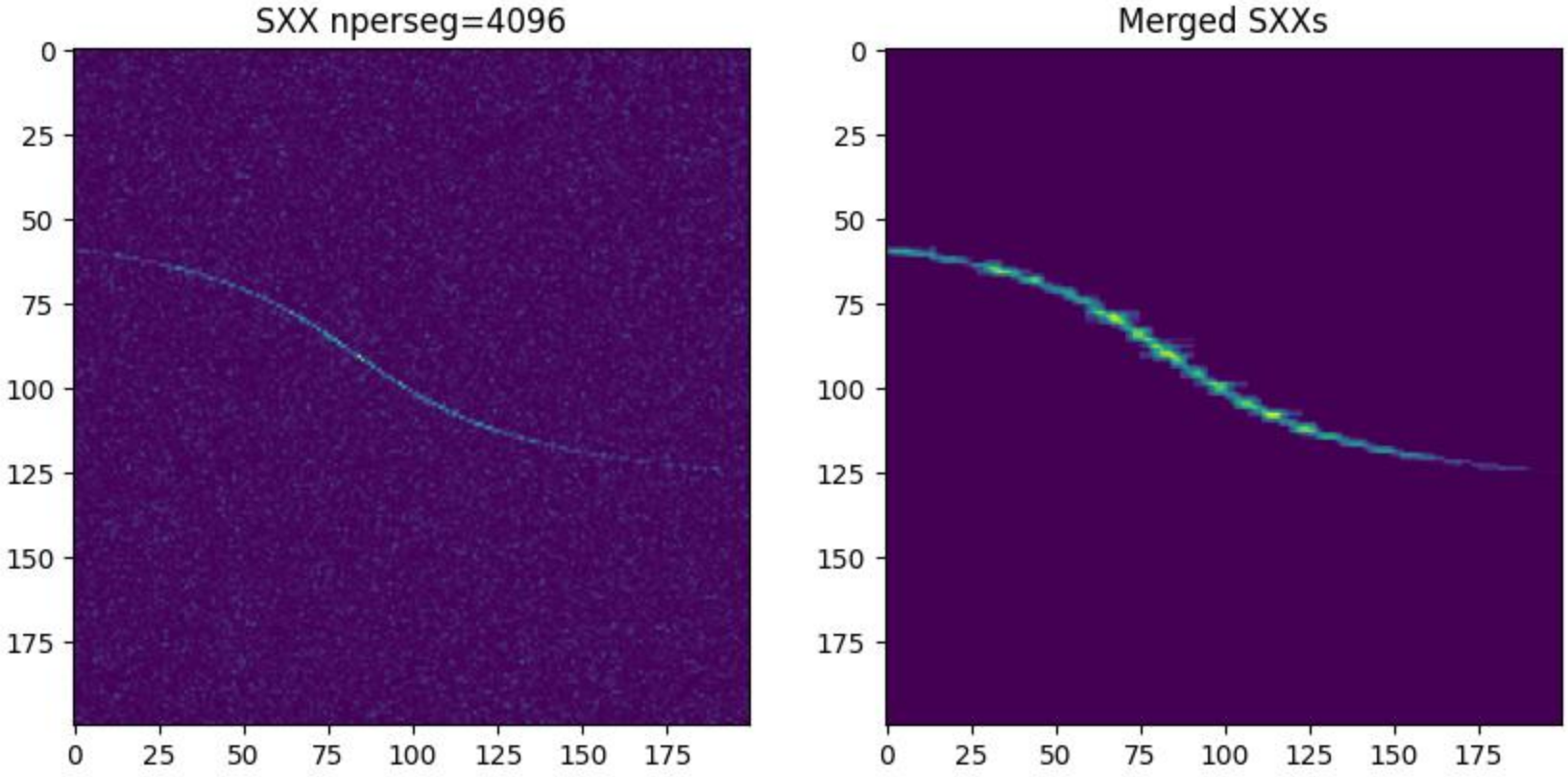
sxxs_targeted_snr=25dB_205.pt



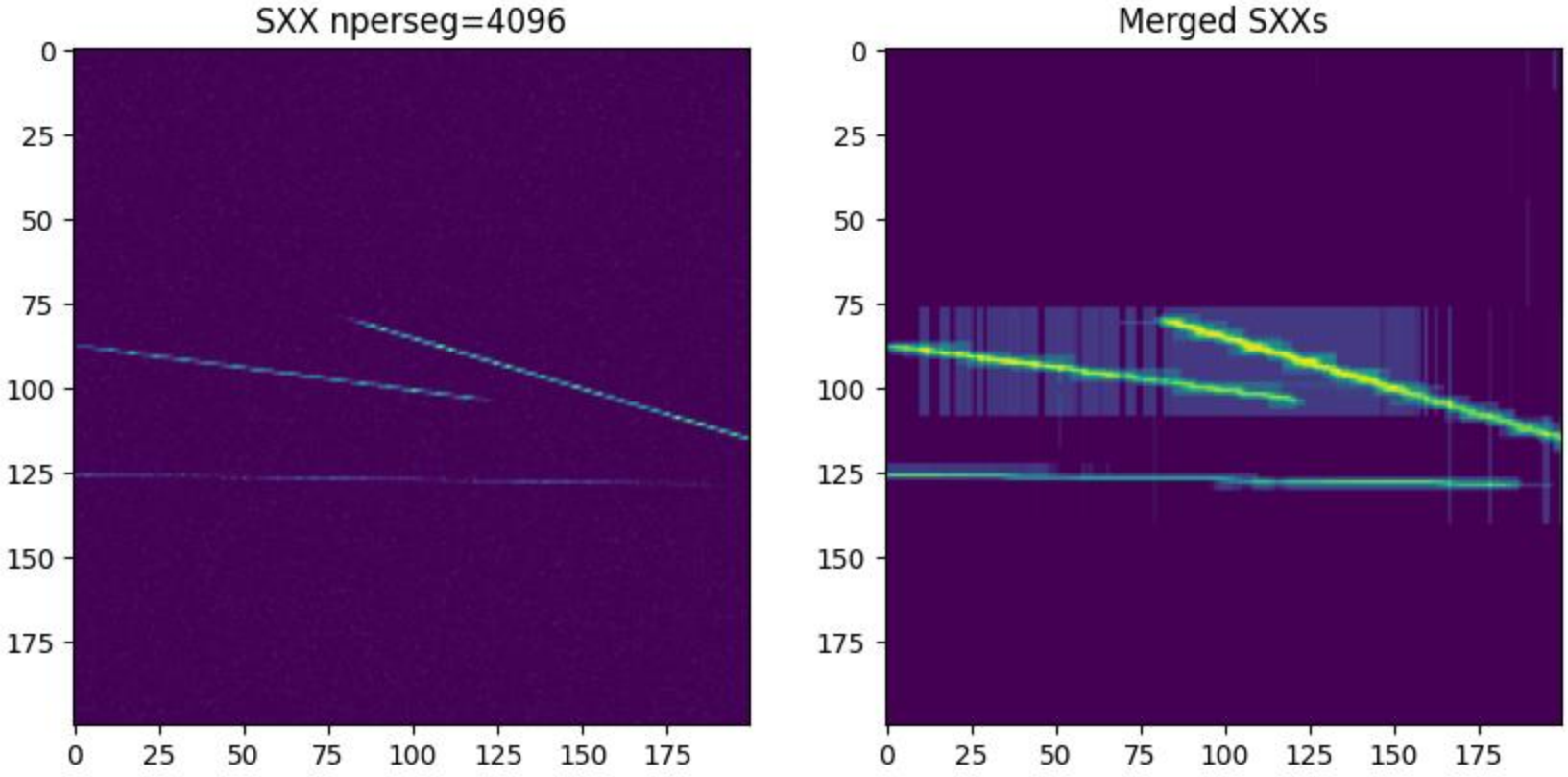
sxxs_targeted_snr=8dB_200.pt



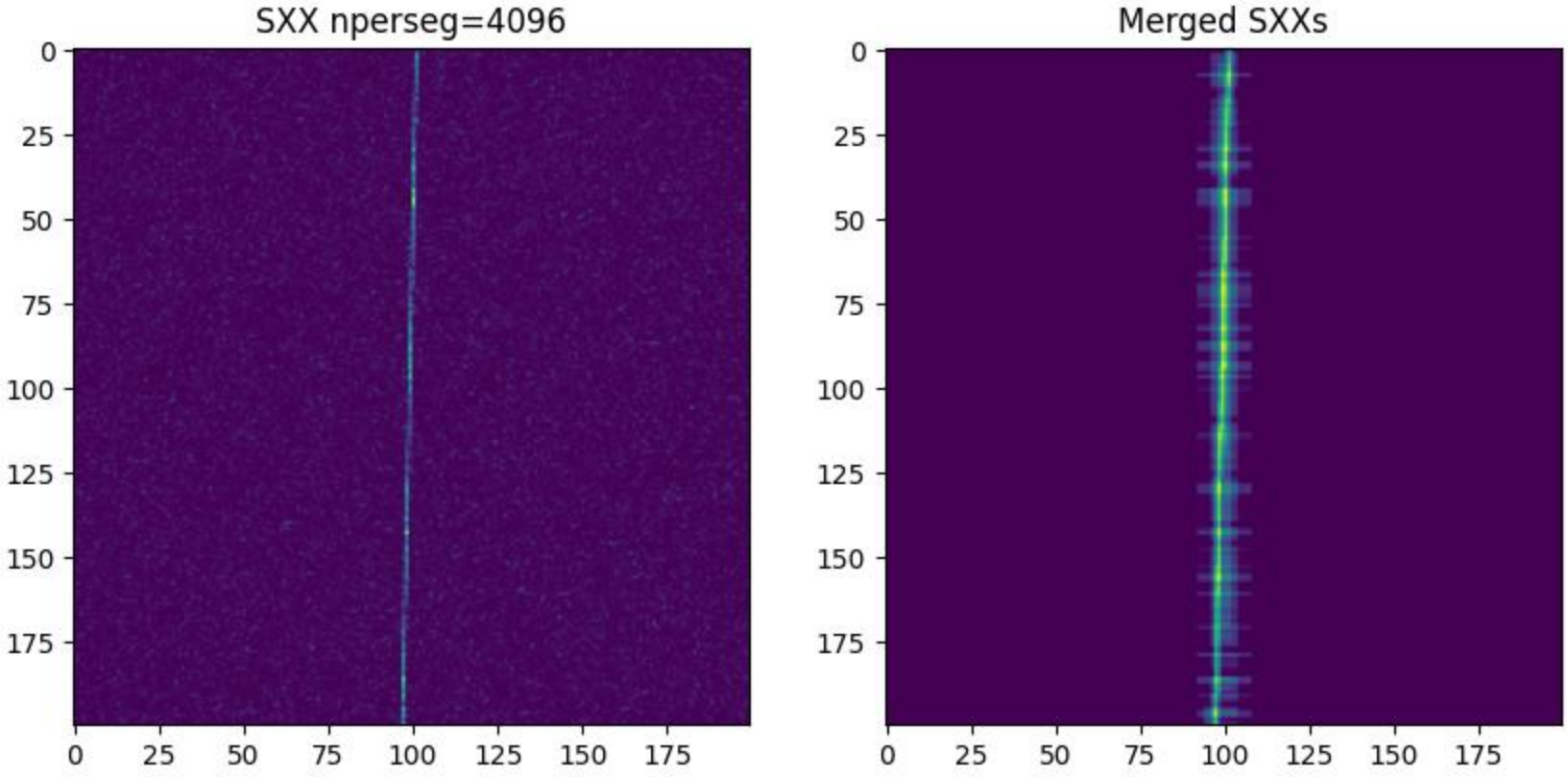
sxxs_targeted_snr=13dB_210.pt



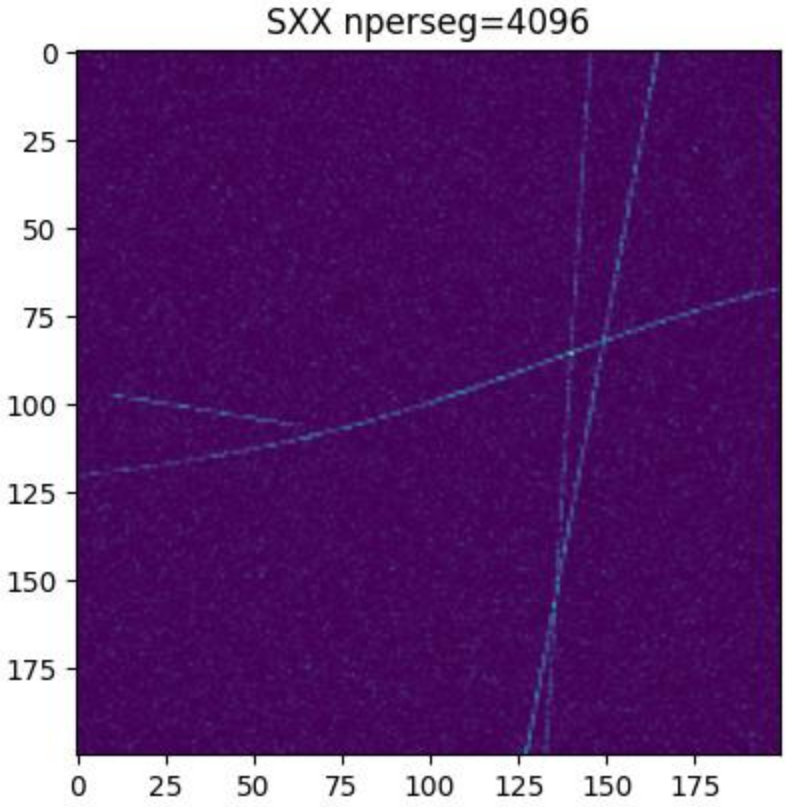
sxxs_targeted_snr=21dB_203.pt

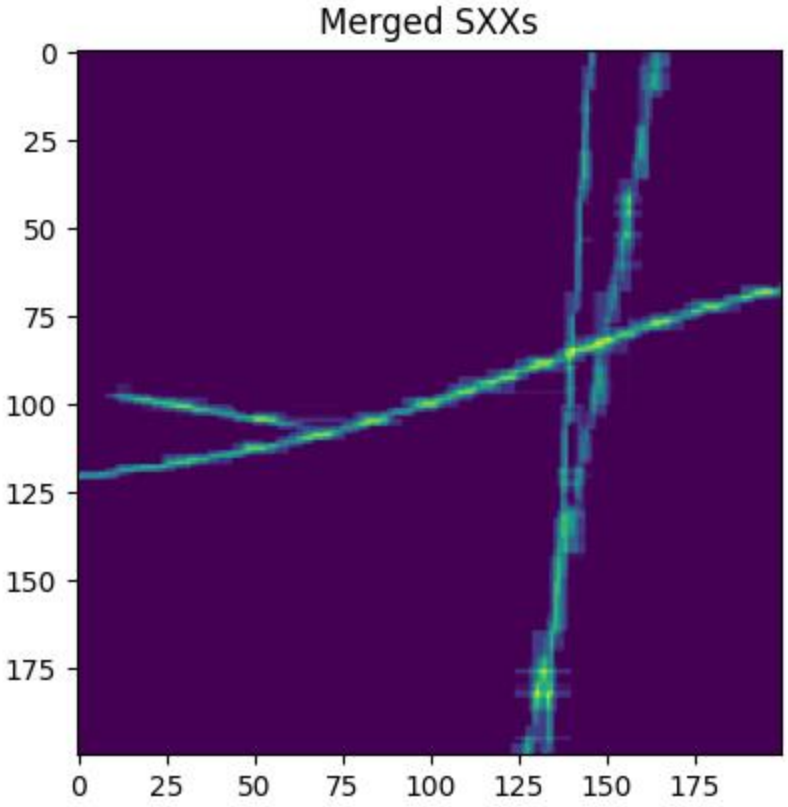


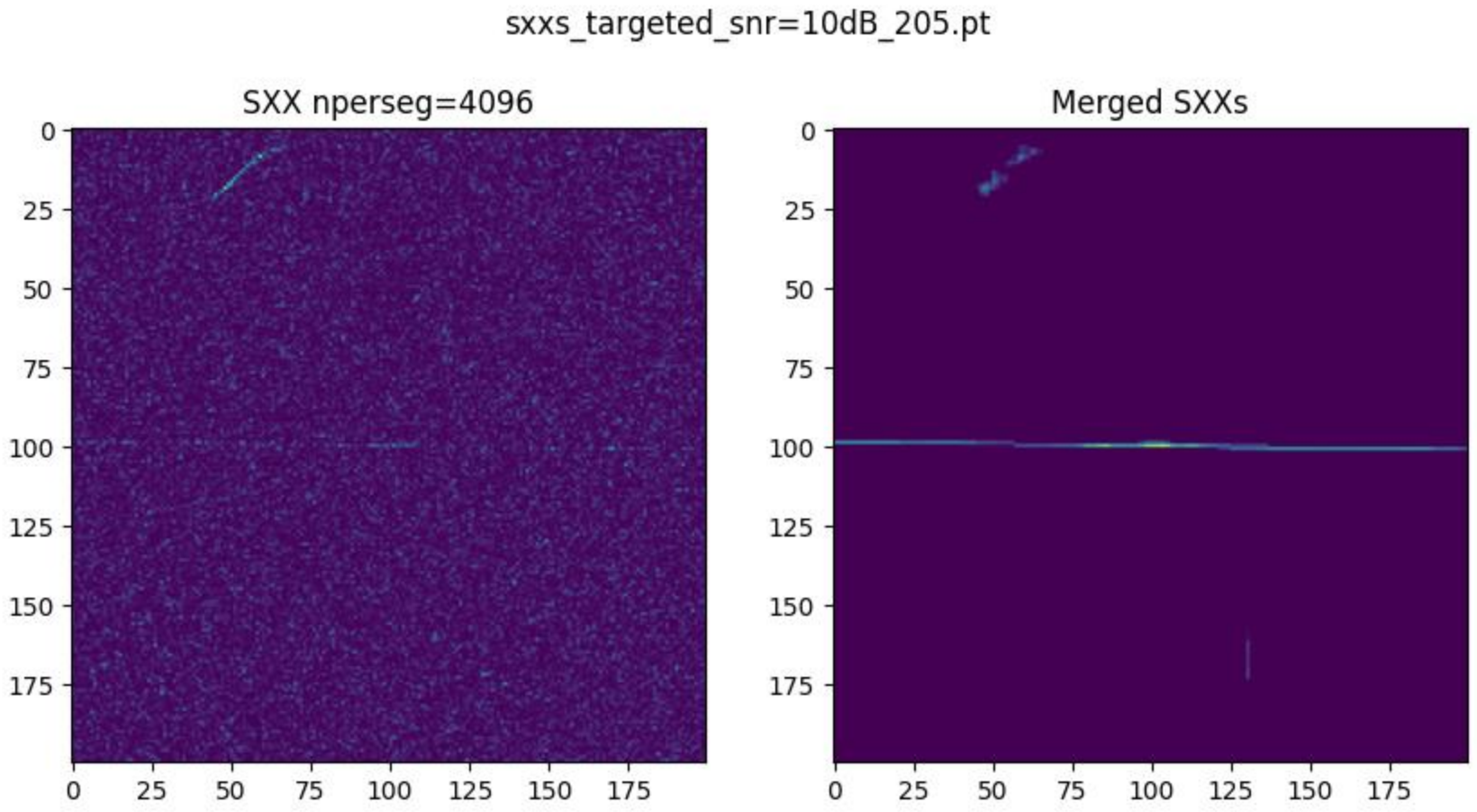
sxxs_targeted_snr=21dB_203.pt



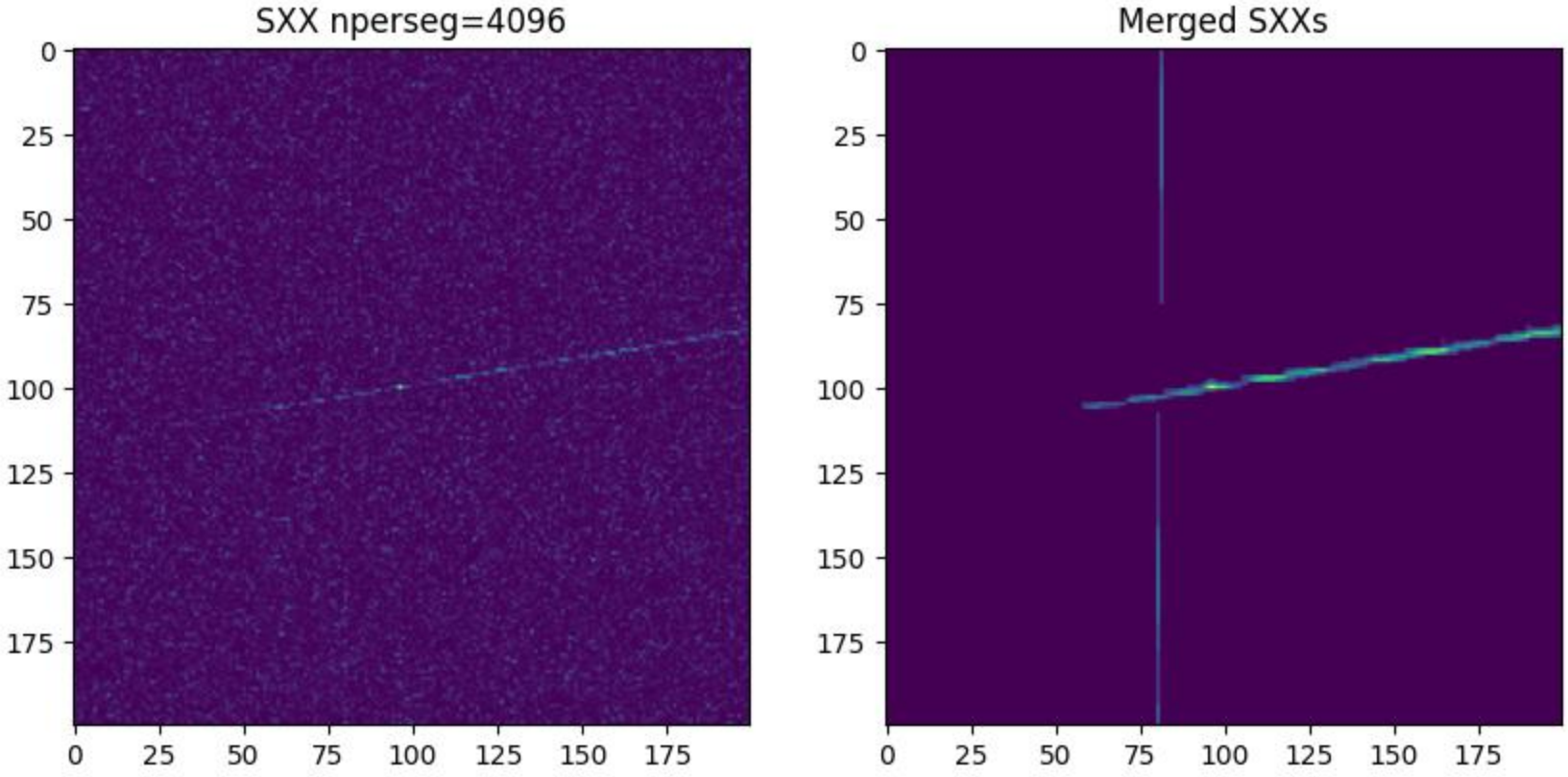
sxxs_targeted_snr=14dB_213.pt



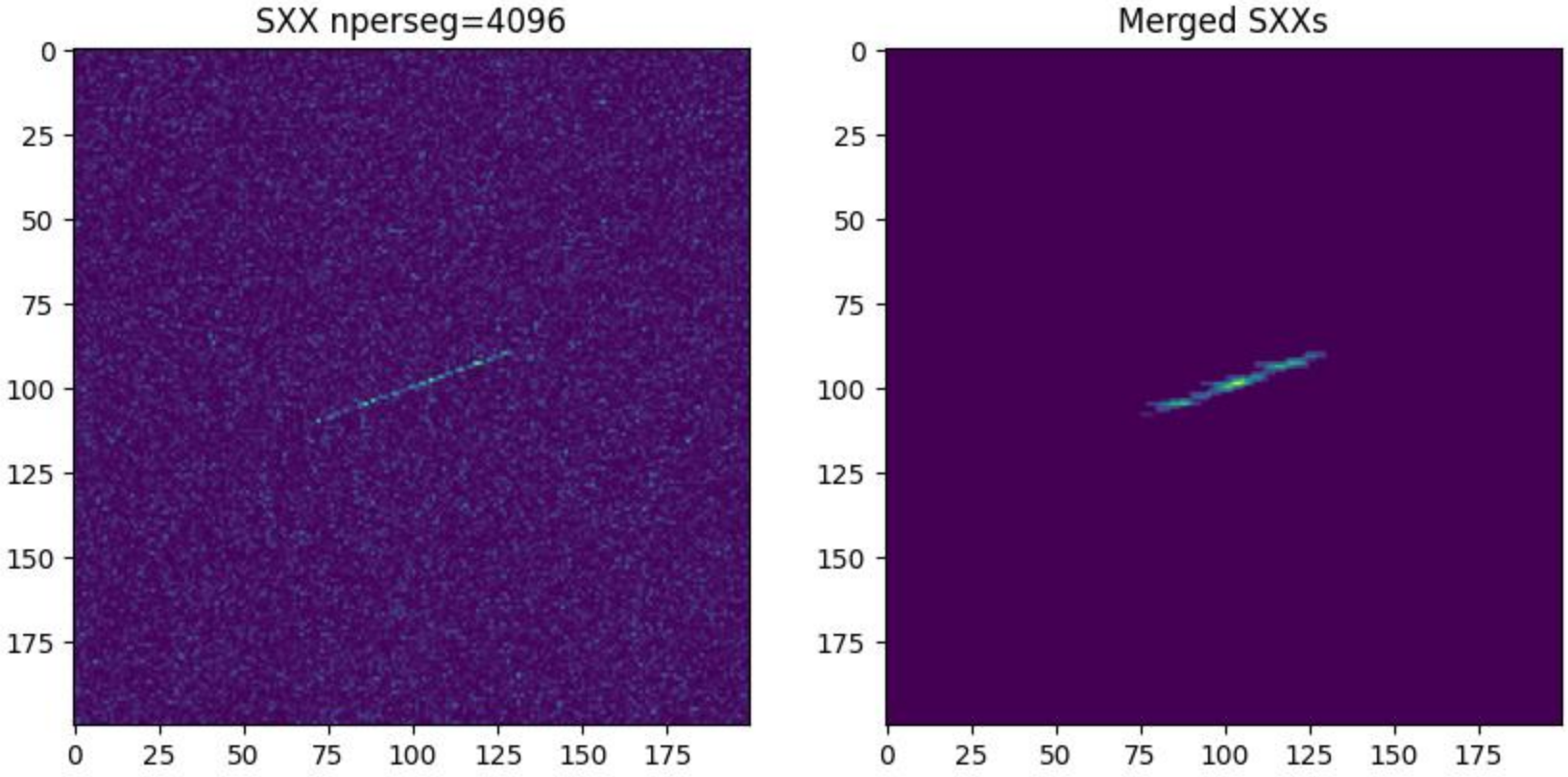



sxxs_targeted_snr=10dB_205.pt
SXX nperseg=4096
Merged SXXs
0
25
50
75
100
125
150
175

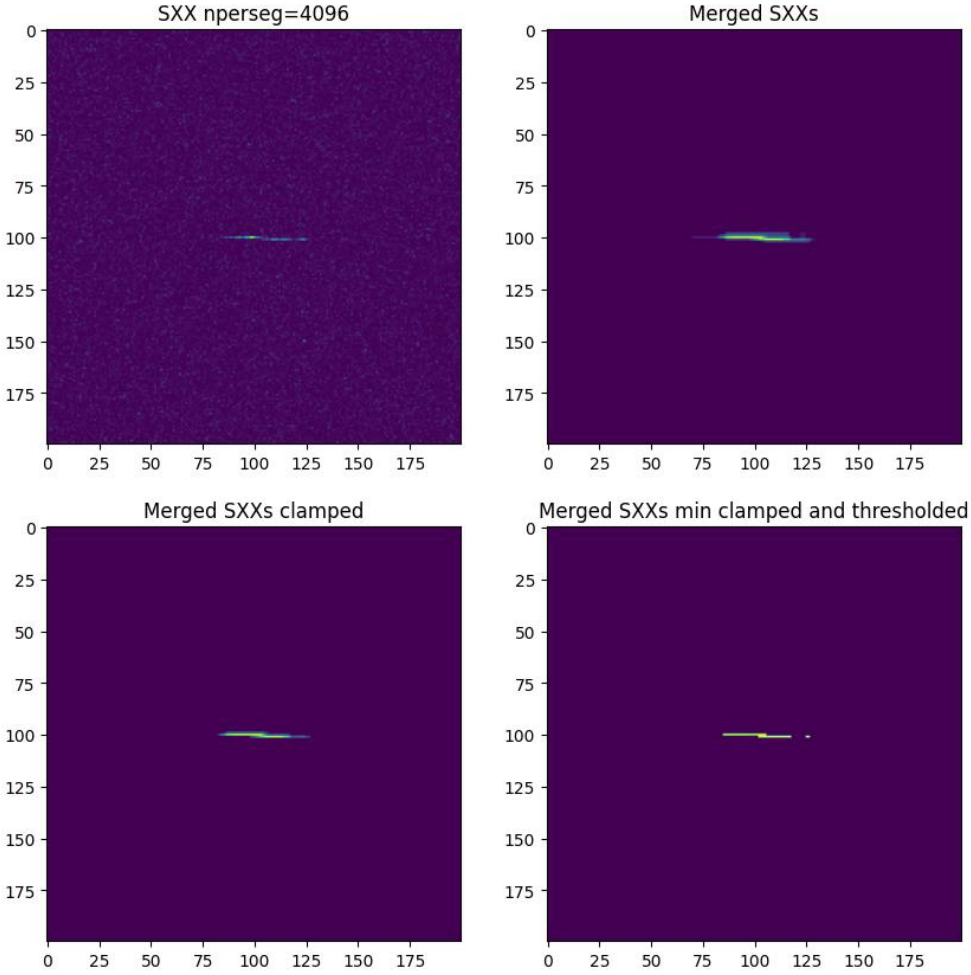
sxxs_targeted_snr=10dB_205.pt



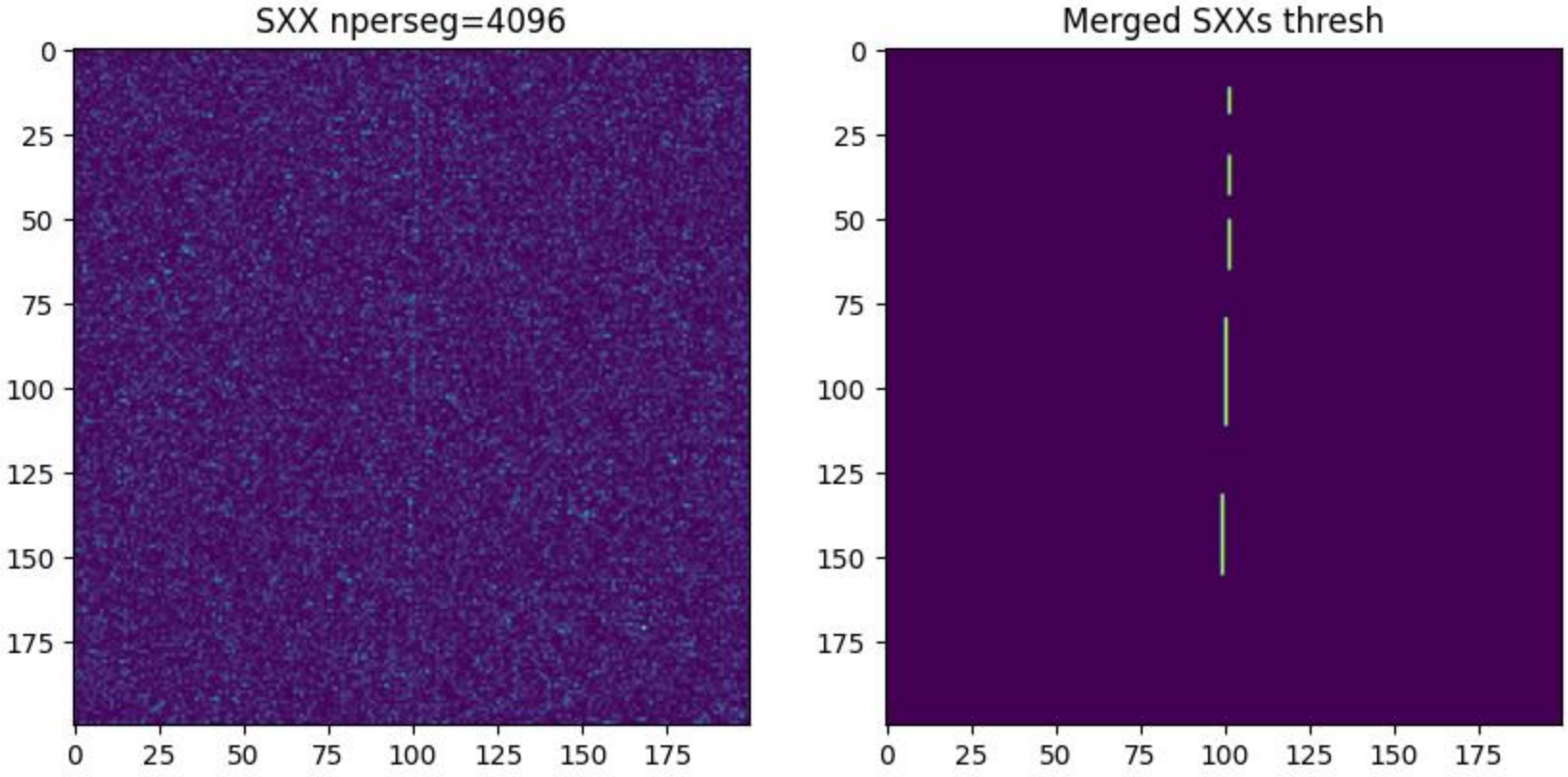
sxxs_targeted_snr=10dB_204.pt



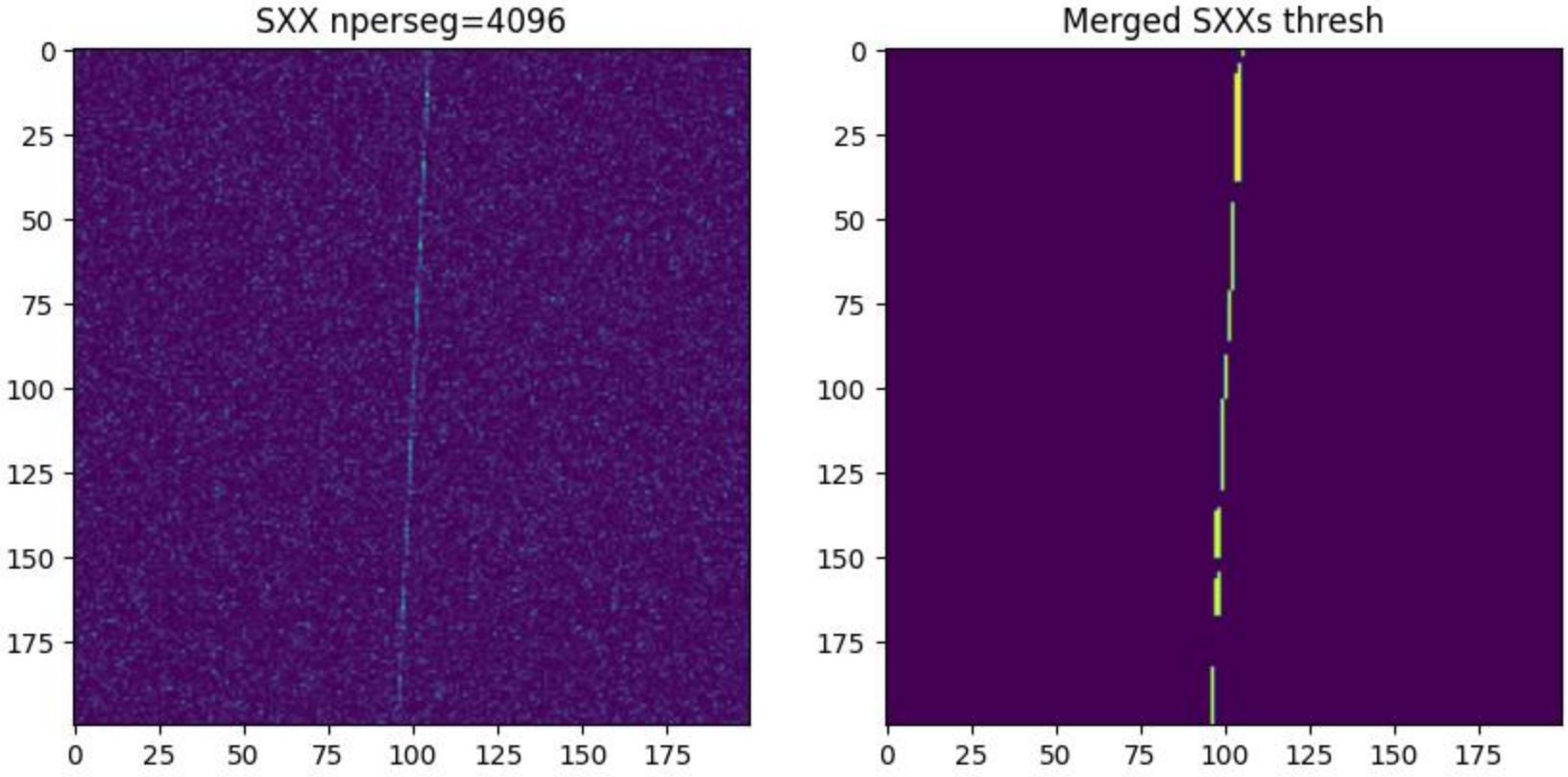
LEGO_snropt_20_sxxs.pt



LEGO_snropt_4_sxxs.pt



LEGO_snropt_7_sxxs.pt



Recherche du seuil minimal afin de garantir 10FP par 4,19ms d'enregistrement
Ce seuil va nous servir à borner inférieur du merged_sxxs

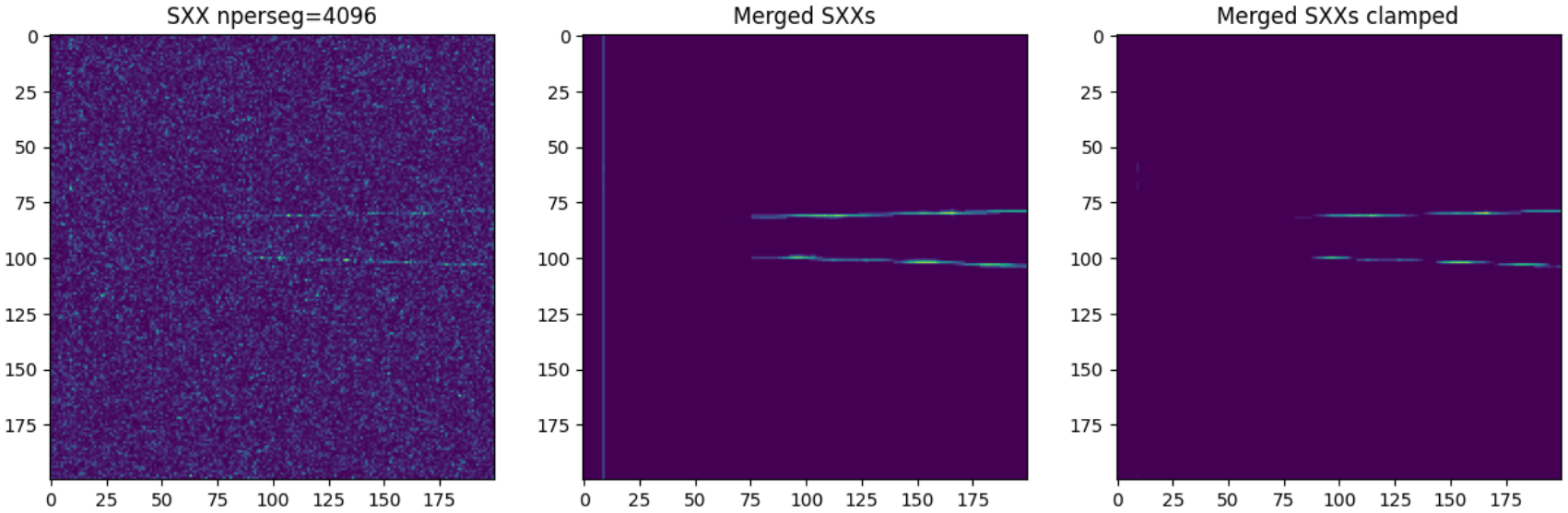
```
1  merged_sxxs_noise.flatten().sort()[0][-20:]
```

✓ 1.0s

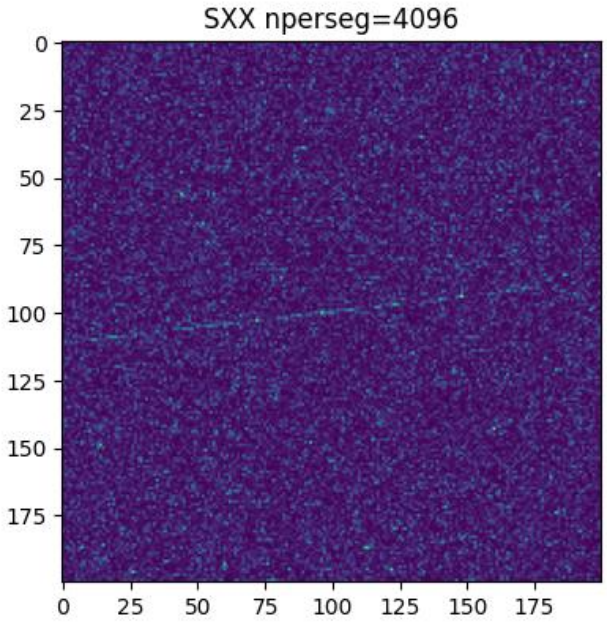
```
tensor([0.1467, 0.1467, 0.1467, 0.1467, 0.1633, 0.1633, 0.1633, 0.1633, 0.1633,
        0.1633, 0.1635, 0.1635, 0.1635, 0.1635, 0.1635, 0.1635, 0.1635, 0.1635,
        0.1635, 0.1635], dtype=torch.float16)
```

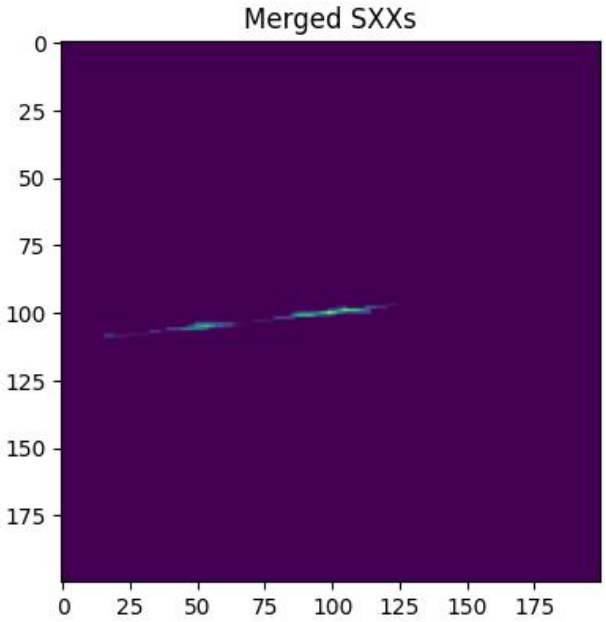
/!\ Cette étape a un fort impact sur le seuil de détection

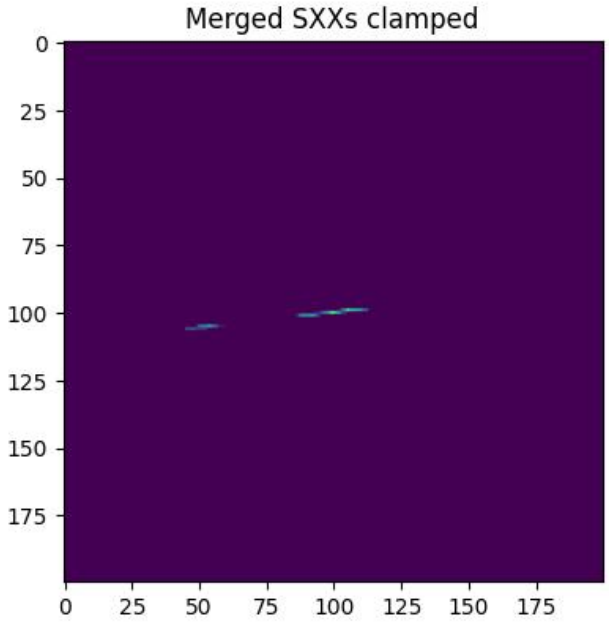
sxxs_targeted_snr=11dB_207.pt



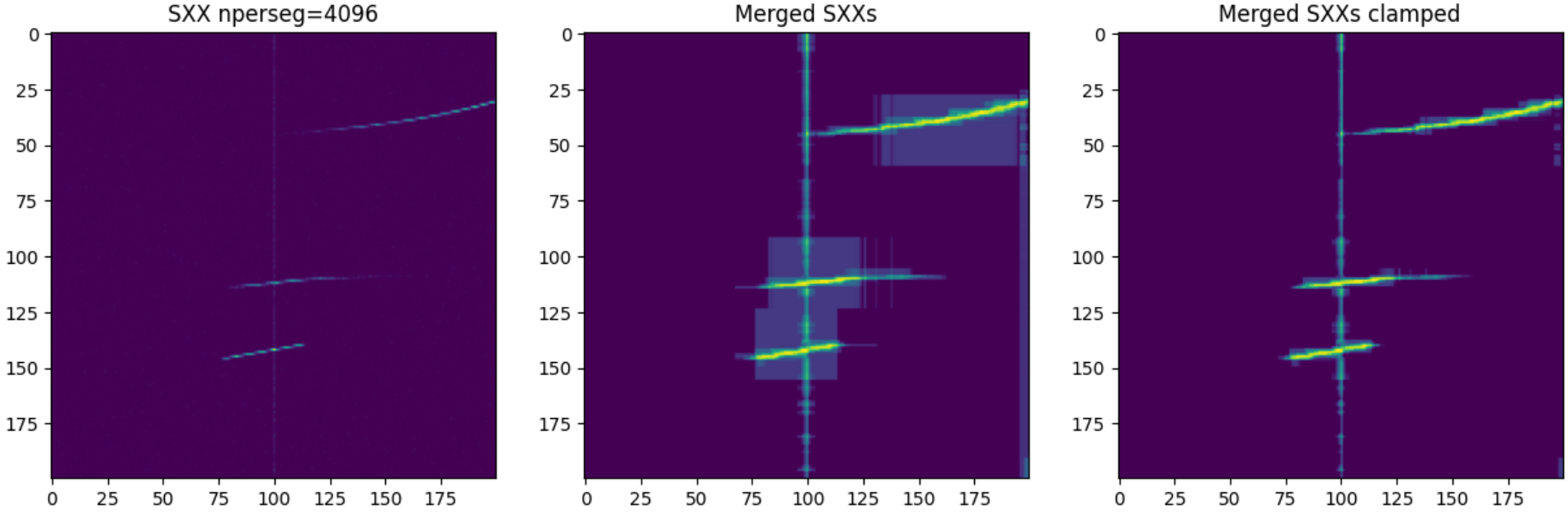
sxxs_targeted_snr=8dB_200.pt



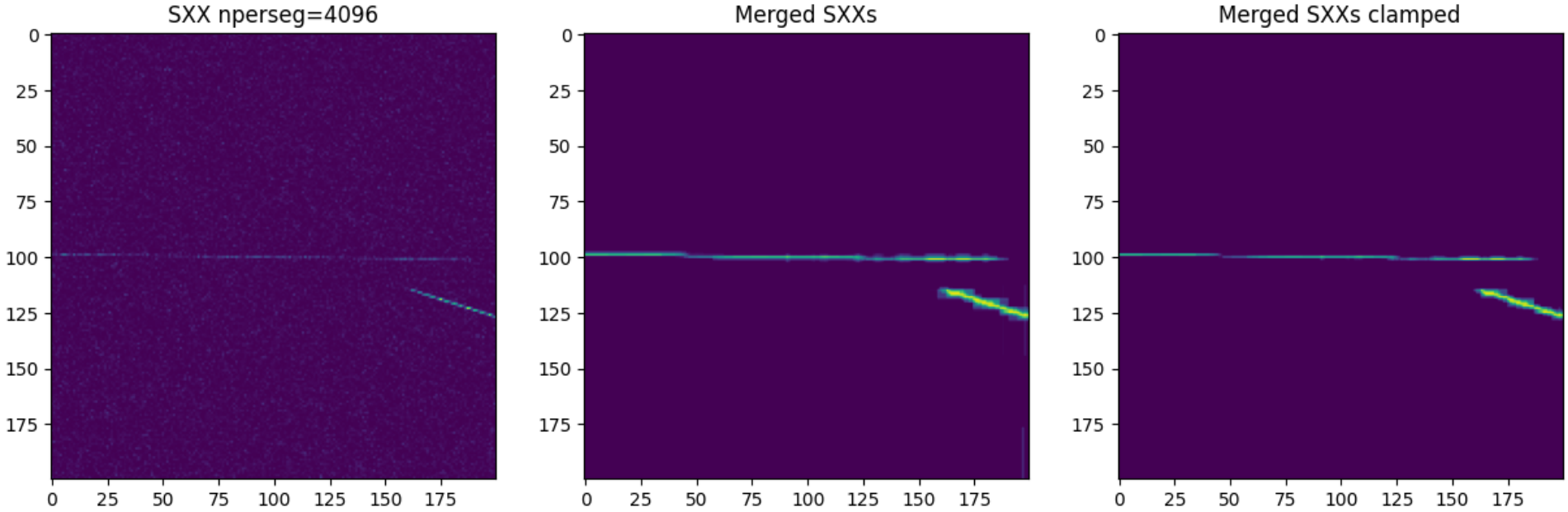




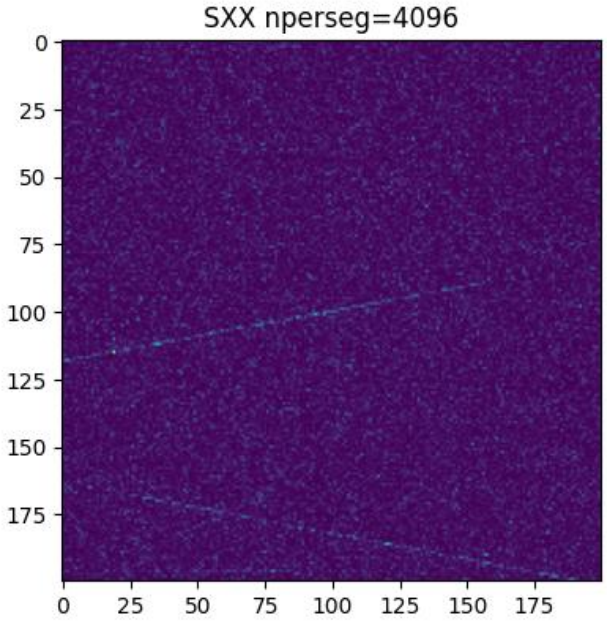
sxxs_targeted_snr=25dB_205.pt

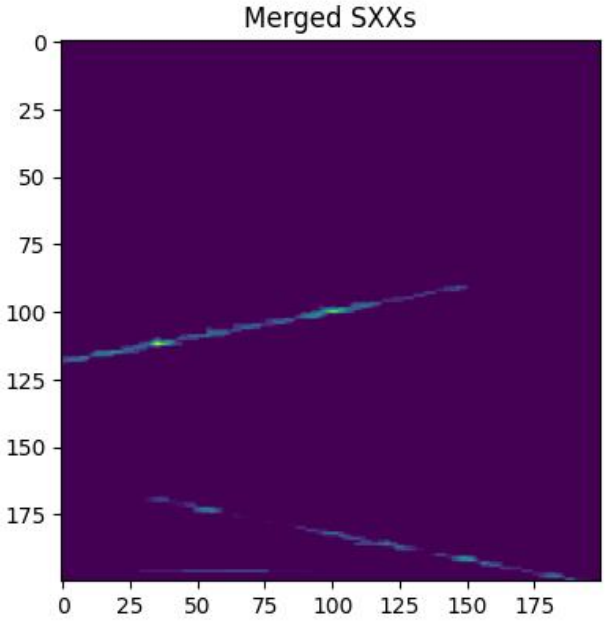


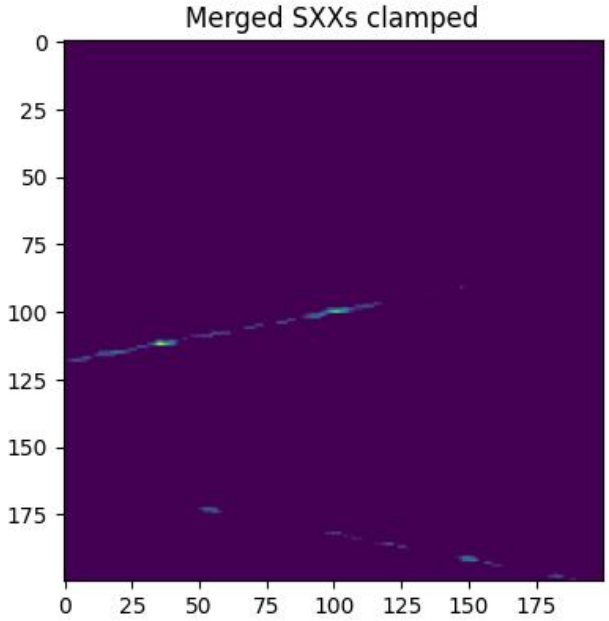
sxxs_targeted_snr=17dB_201.pt



sxxs_targeted_snr=9dB_202.pt







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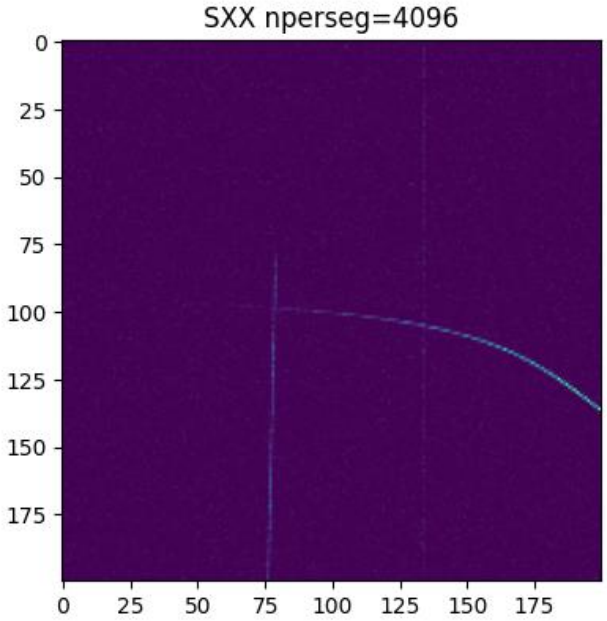
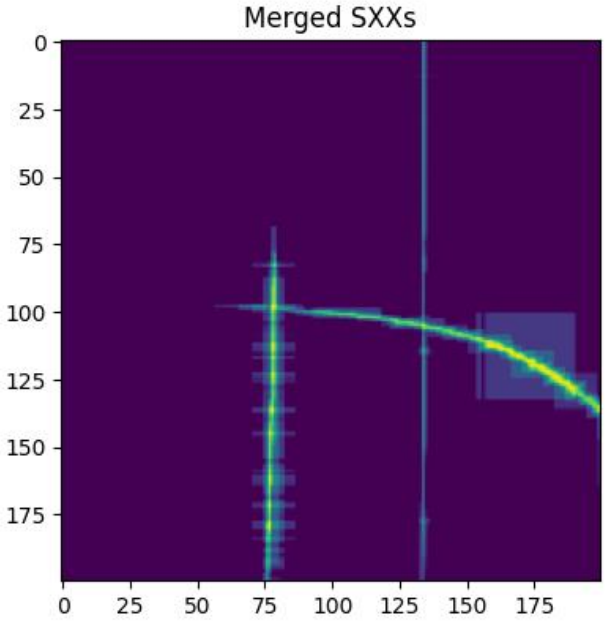
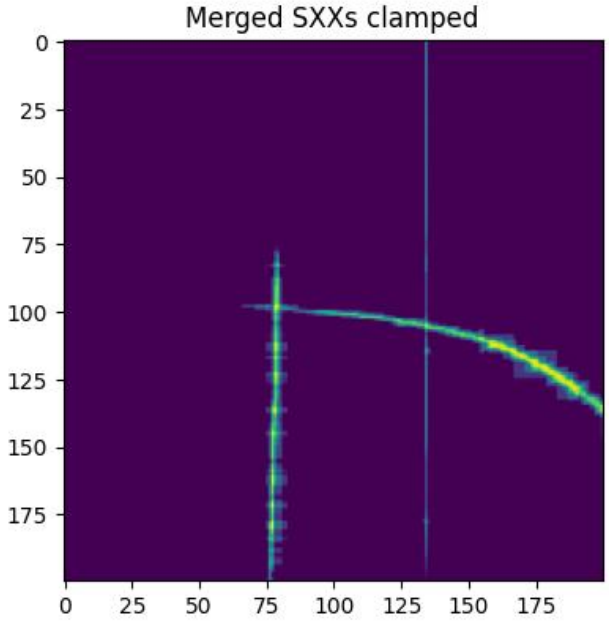
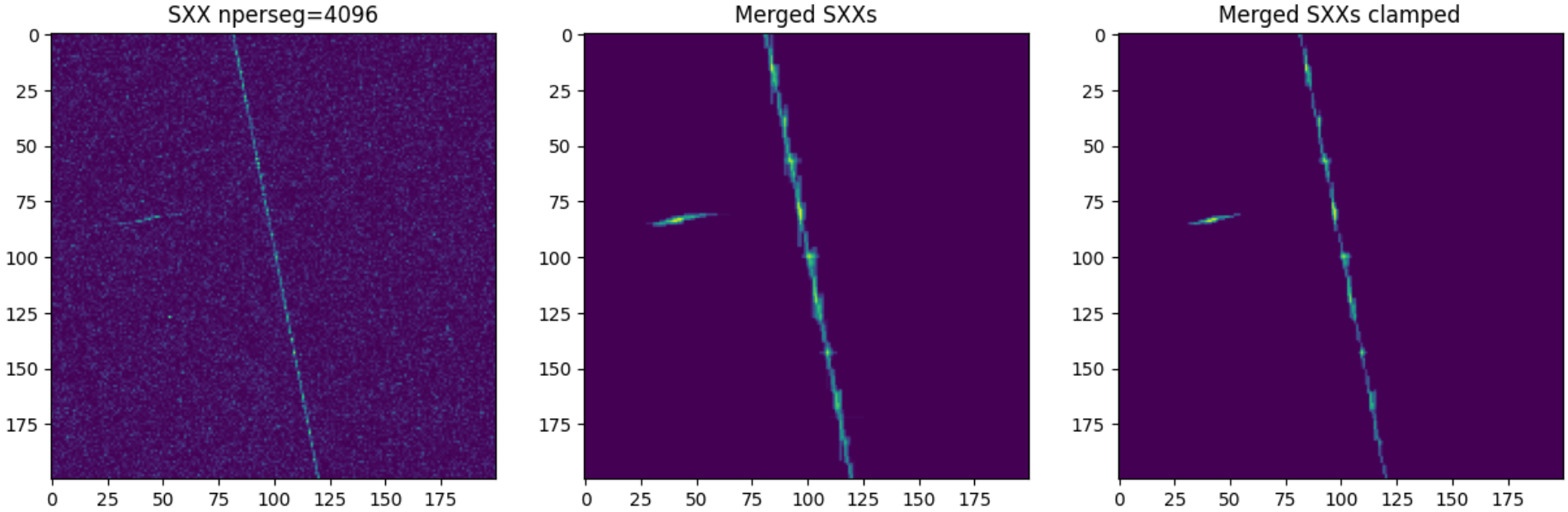


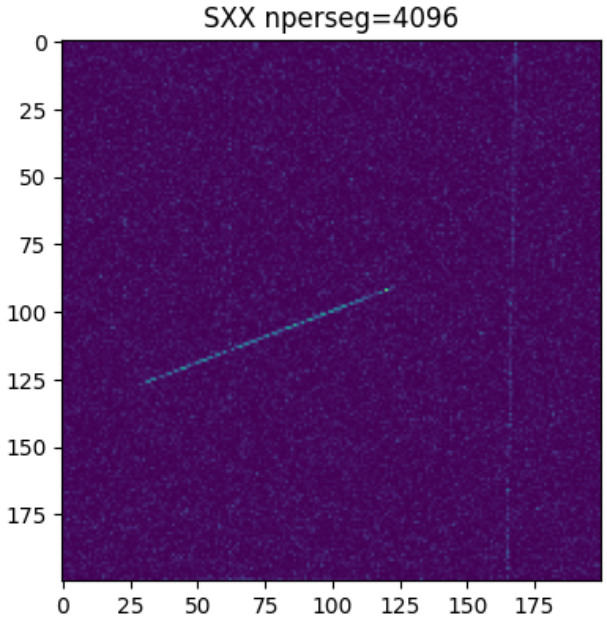


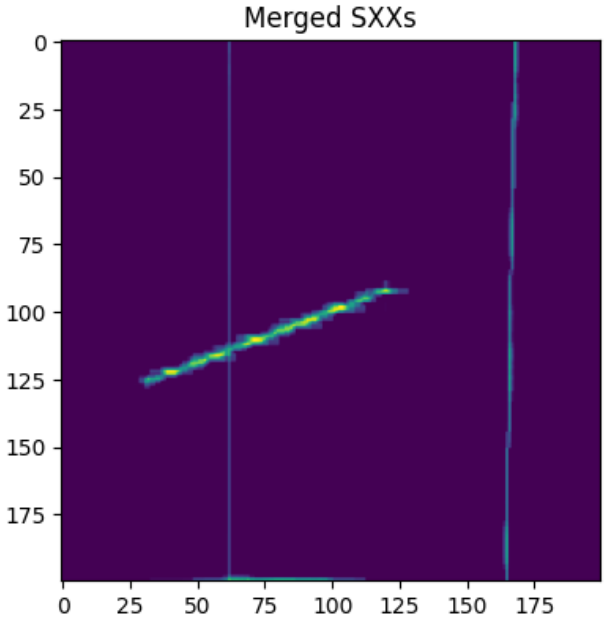


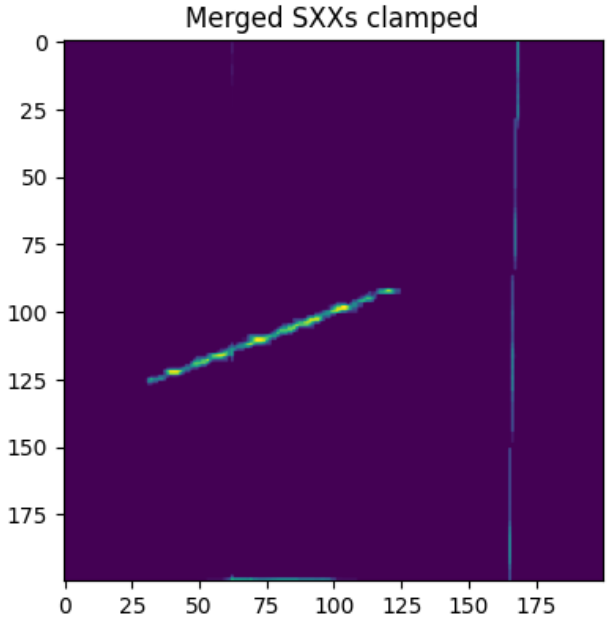
sxxs_targeted_snr=13dB_210.pt



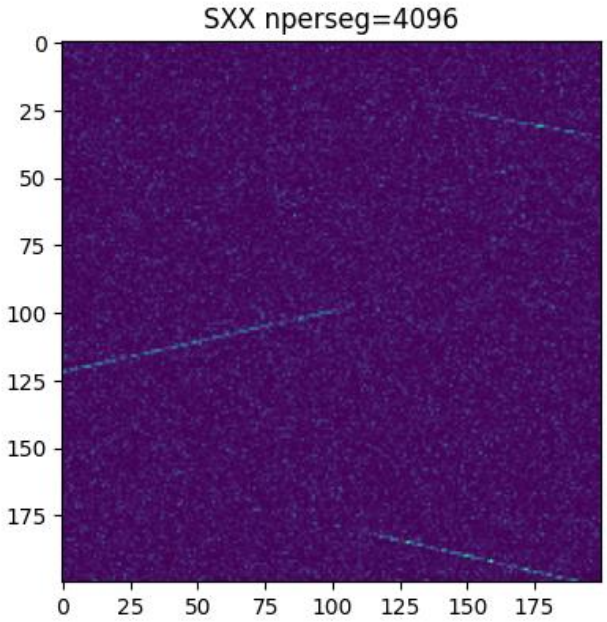
sxxs_targeted_snr=13dB_210.pt

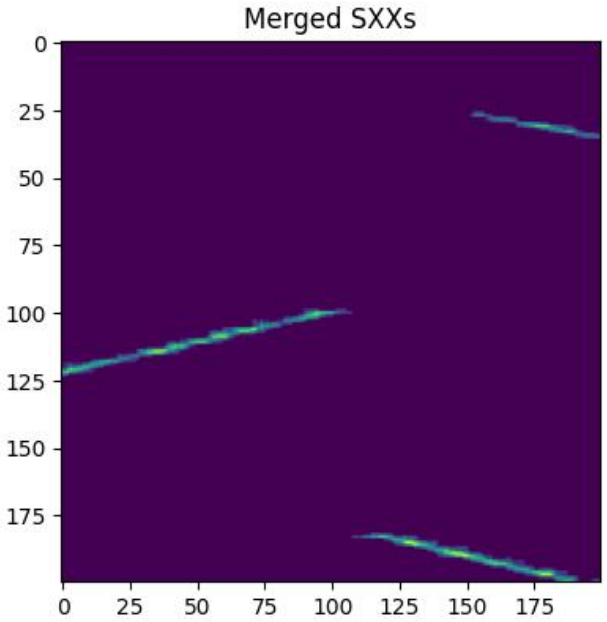


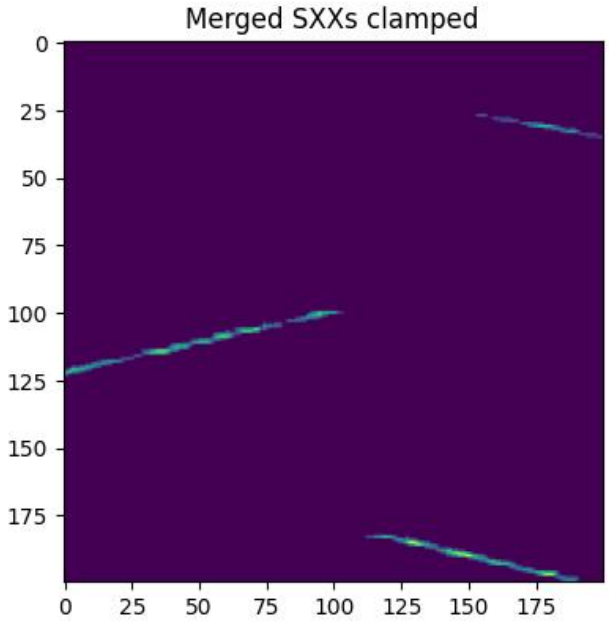




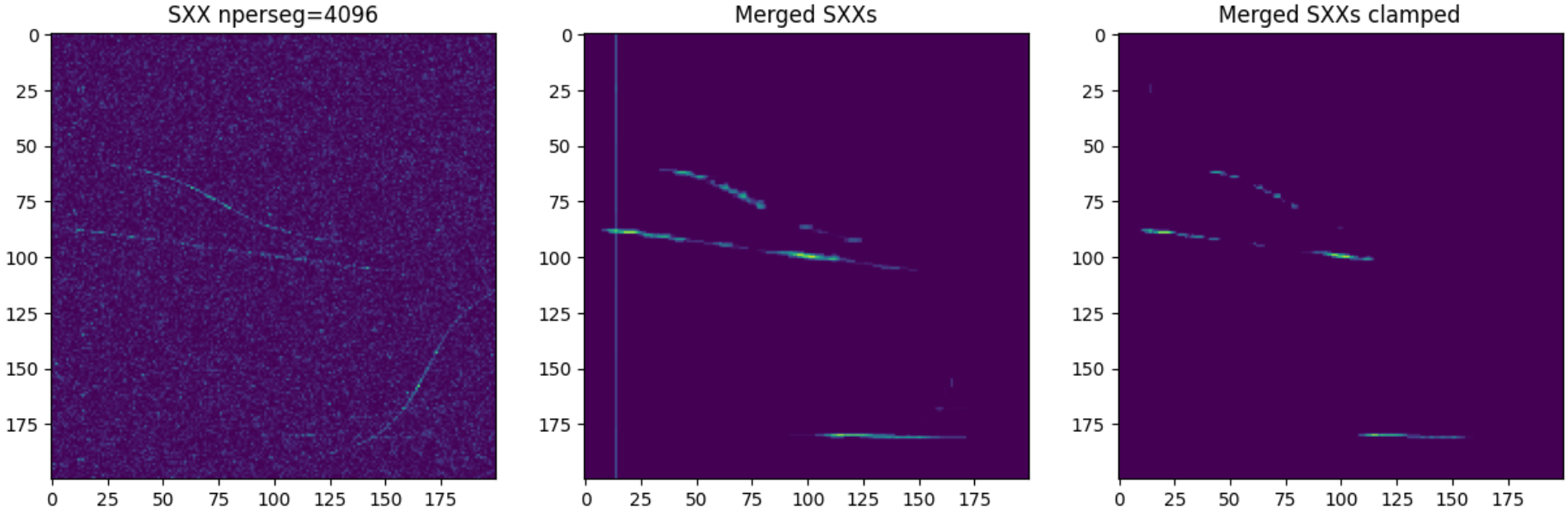
sxxs_targeted_snr=11dB_206.pt



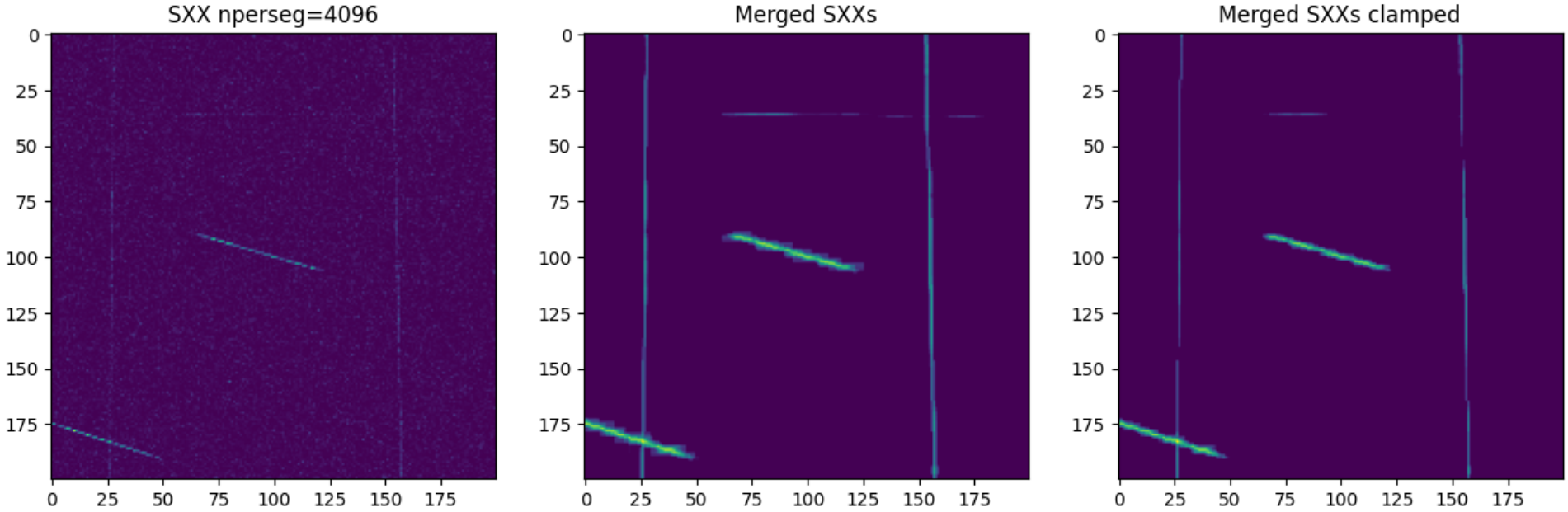




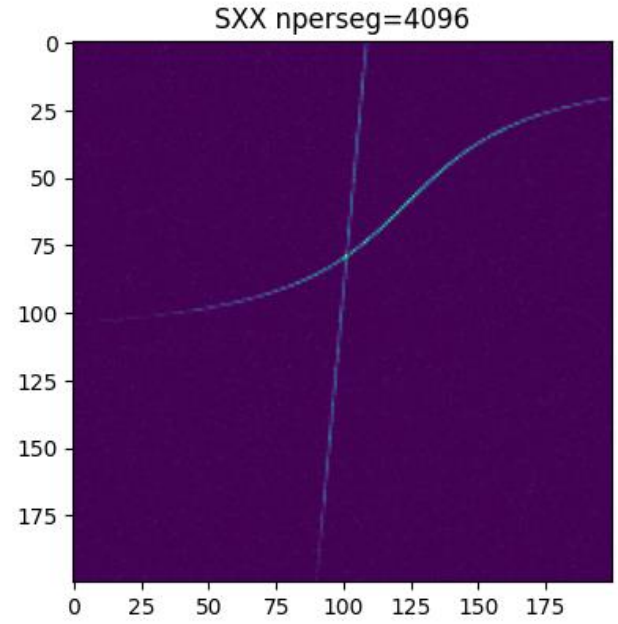
sxxs_targeted_snr=9dB_203.pt

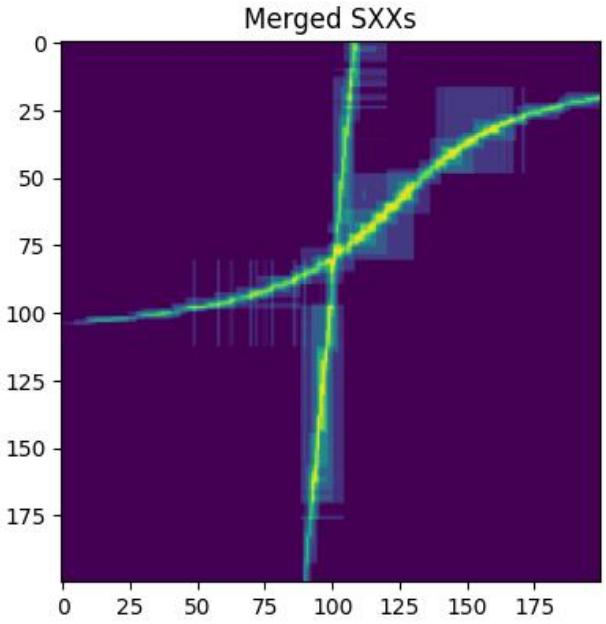


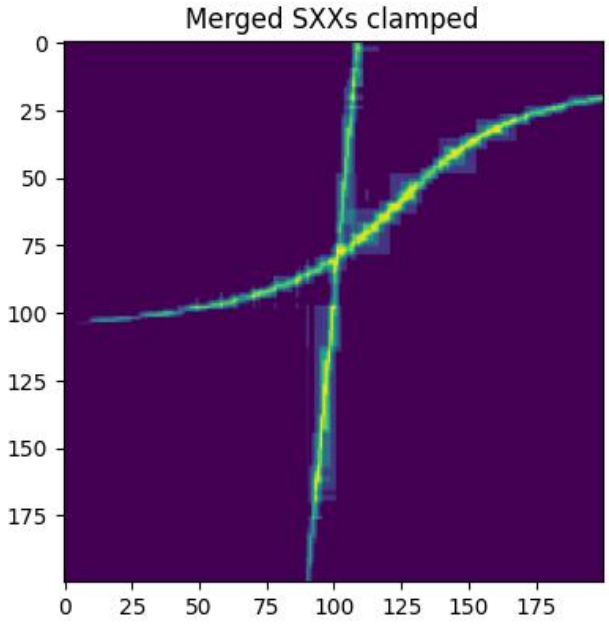
sxxs_targeted_snr=15dB_215.pt



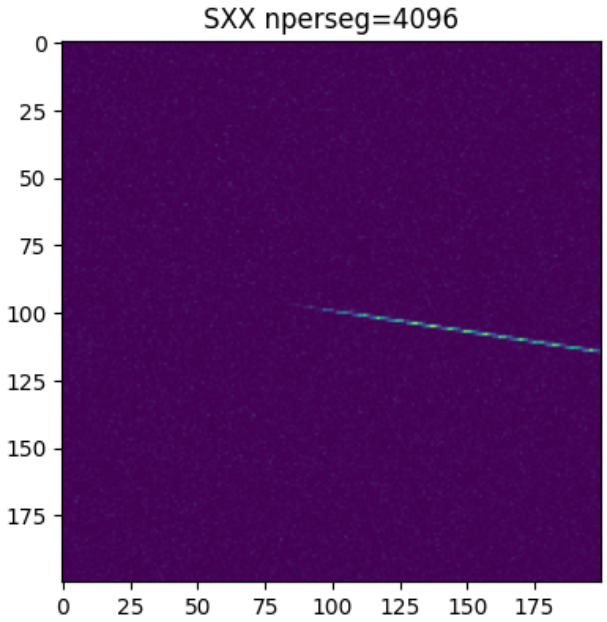
sxxs_targeted_snr=21dB_202.pt

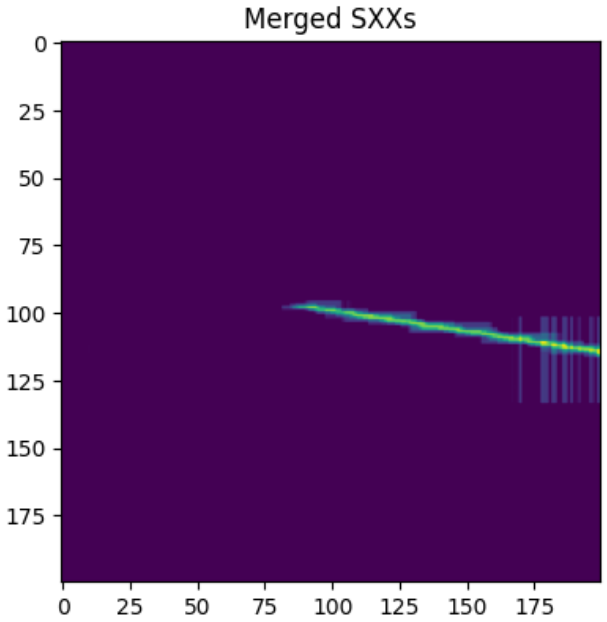


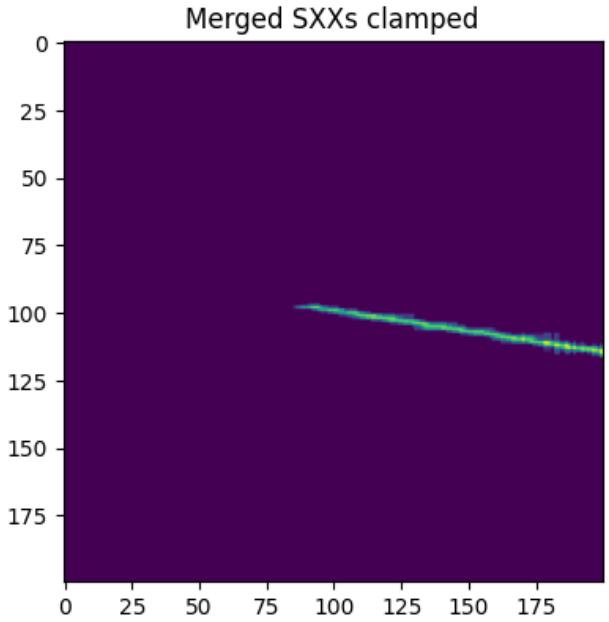




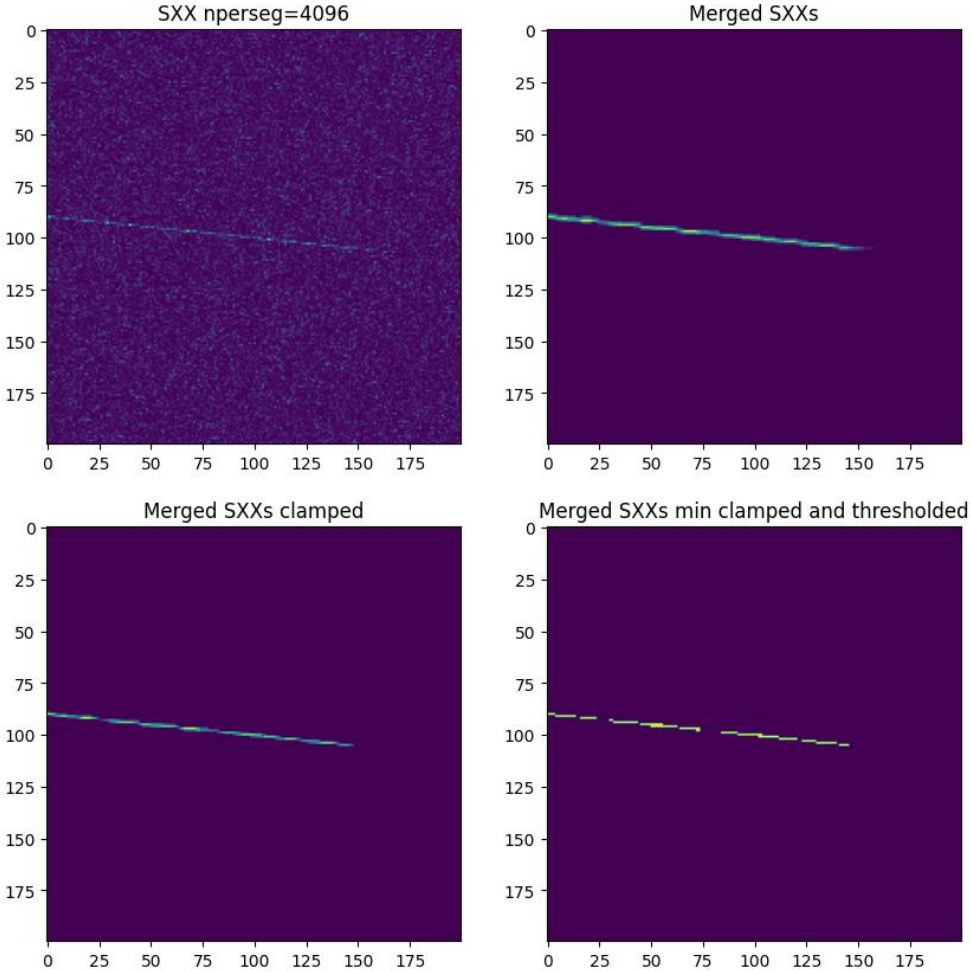
sxxs_targeted_snr=21dB_202.pt







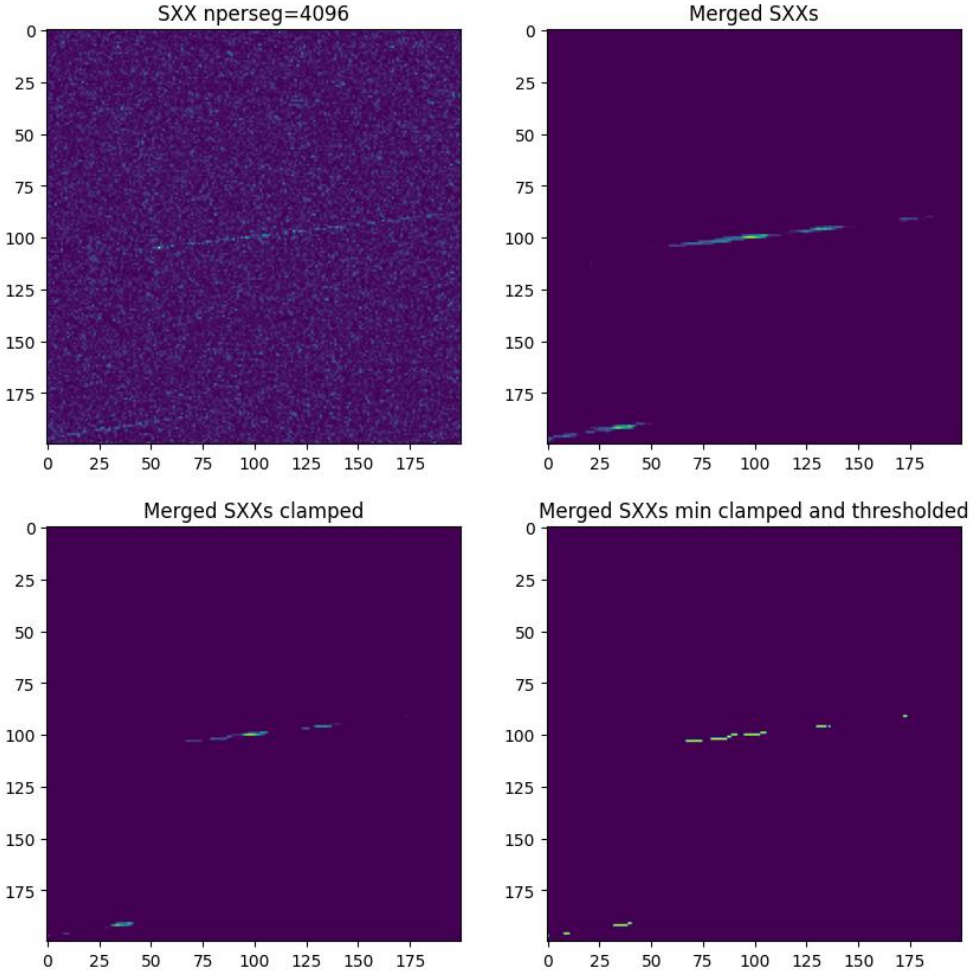
LEGO_snropt_6_sxxs.pt

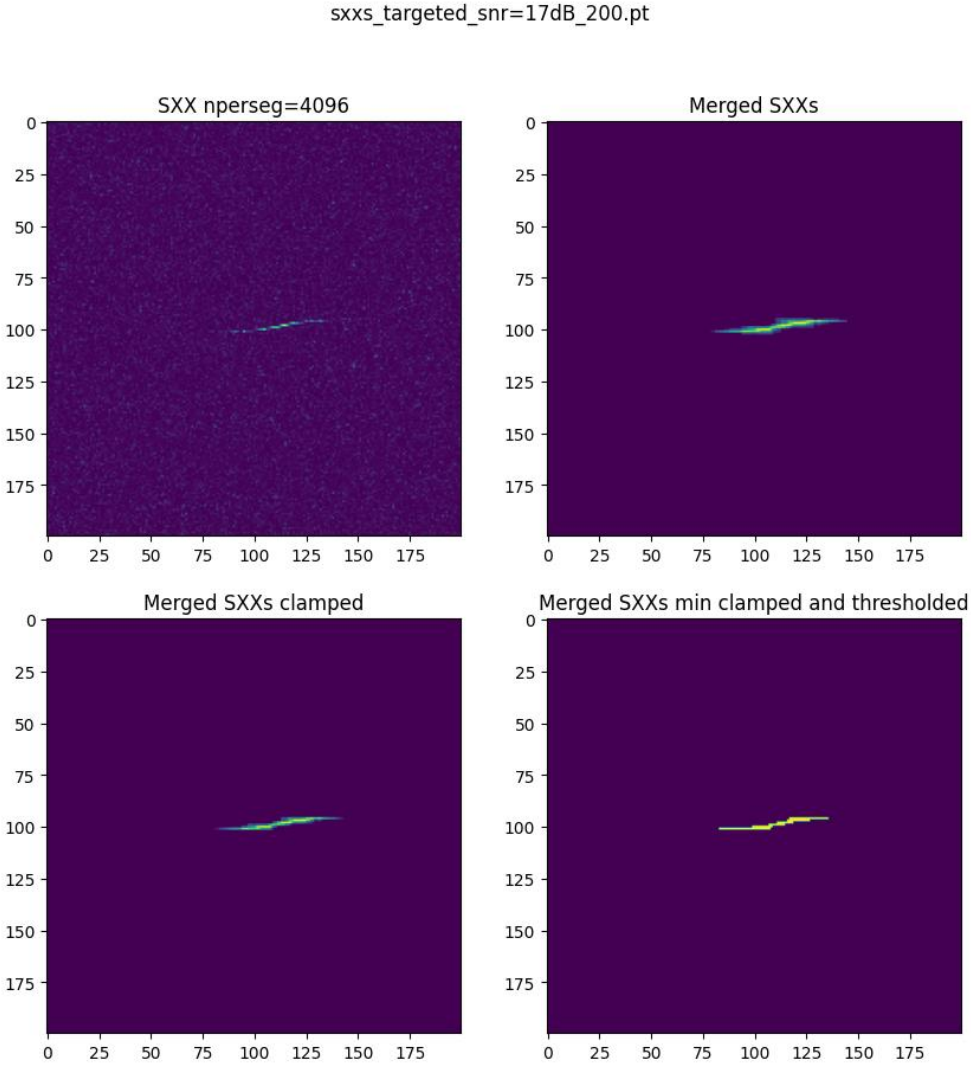


Recherche du seuil maximal local afin de séparer le fond des signaux.

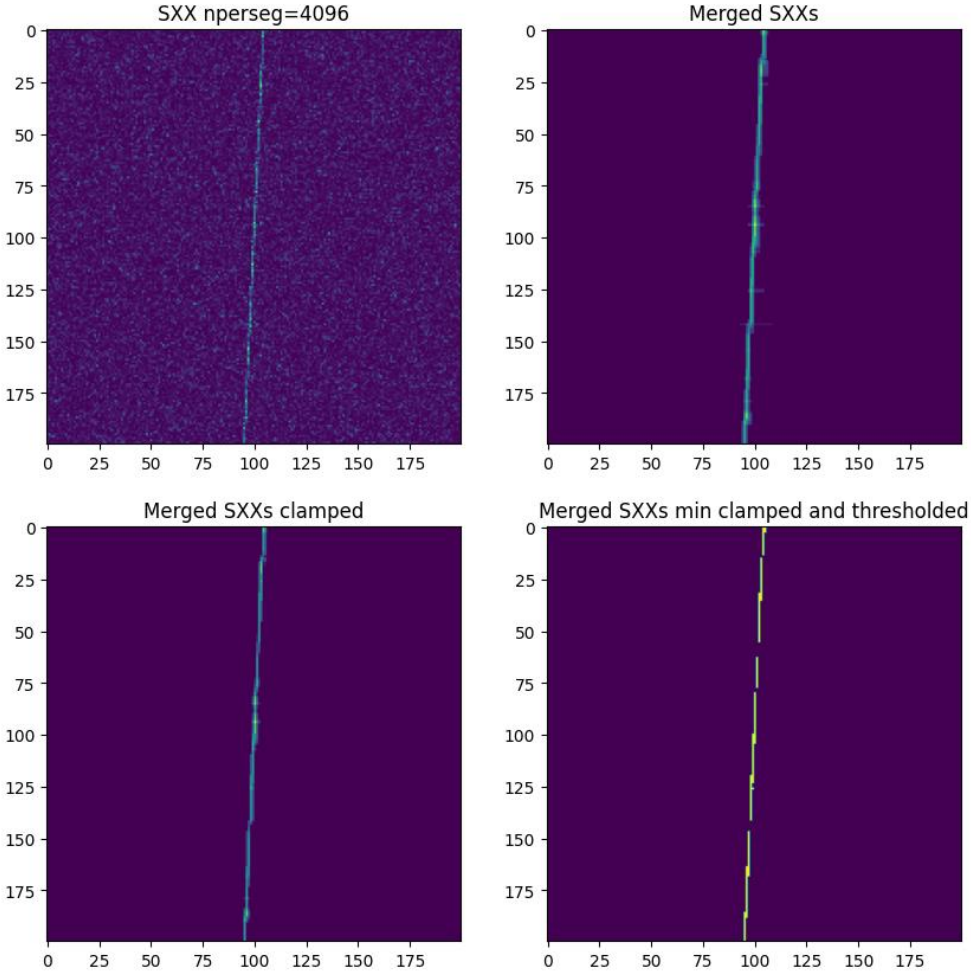
Taille du patch 64x64

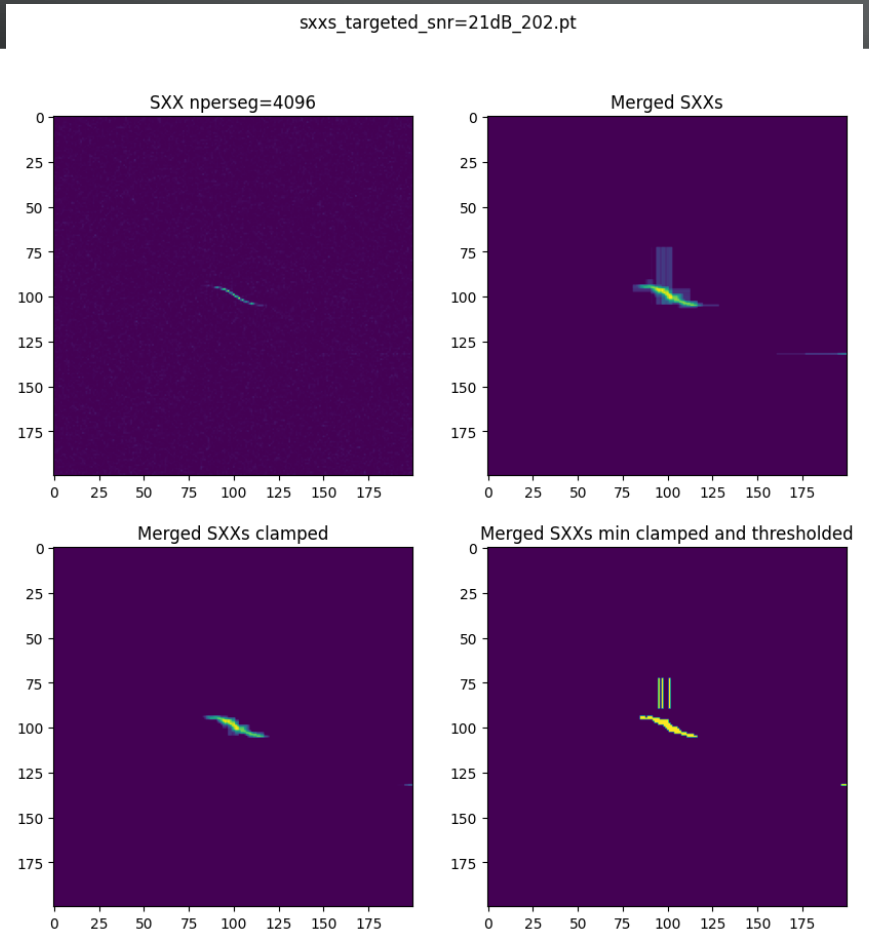
sxxs_targeted_snr=8dB_200.pt

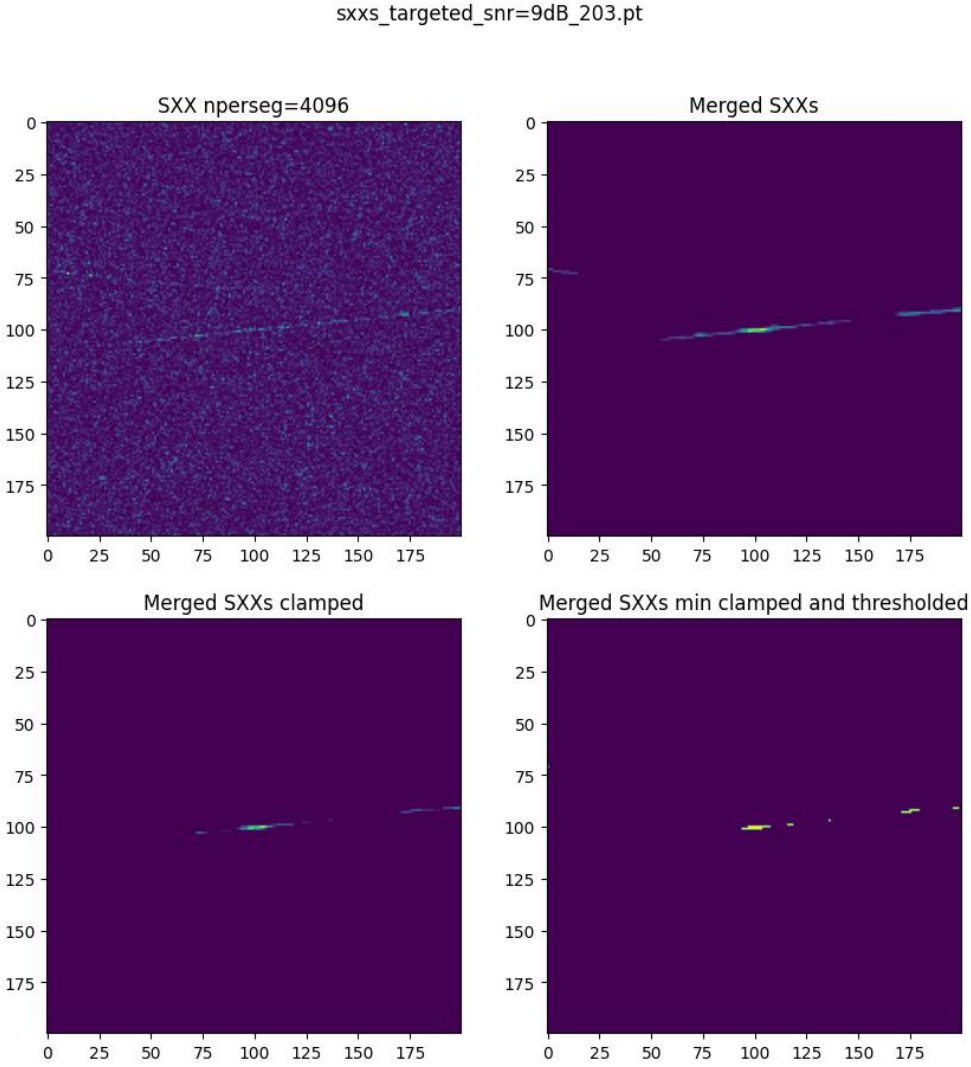



sxxs_targeted_snr=17dB_200.pt
SXX nperseg=4096
Merged SXXs
Merged SXXs clamped
Merged SXXs min clamped and thresholded
0
25
50
75
100
125
150
175

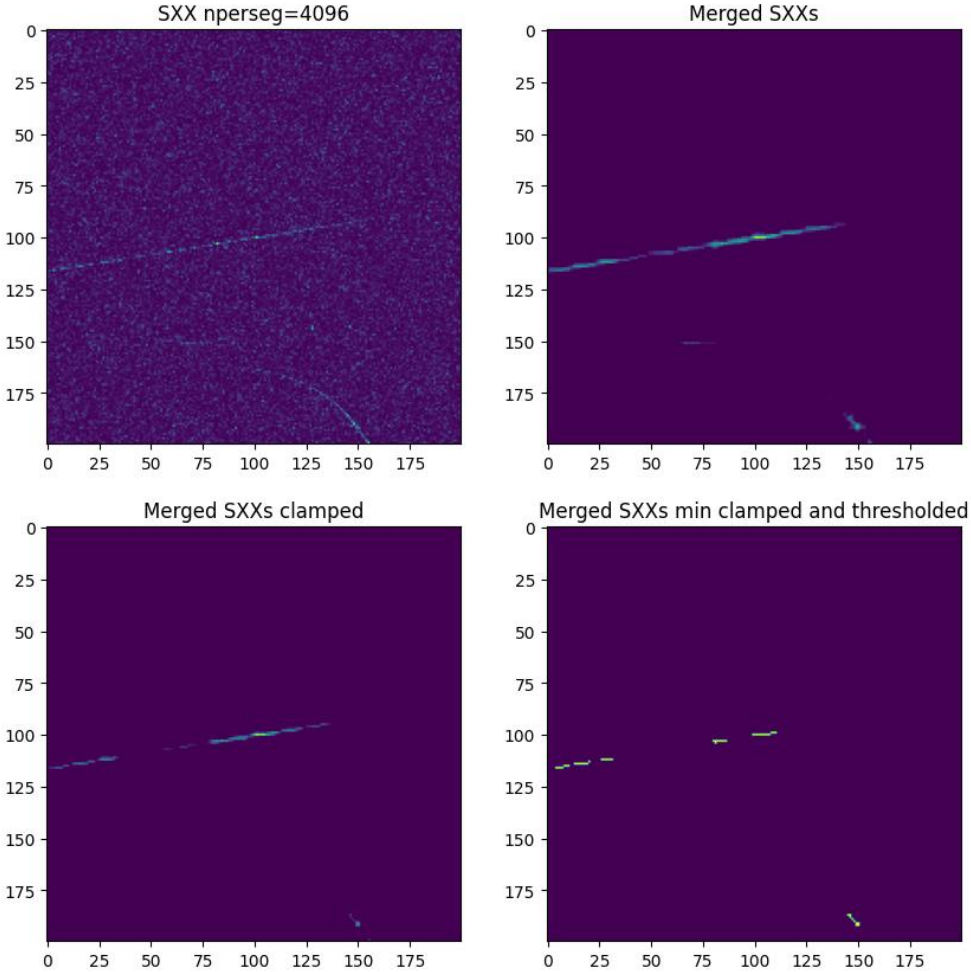
sxxs_targeted_snr=15dB_214.pt



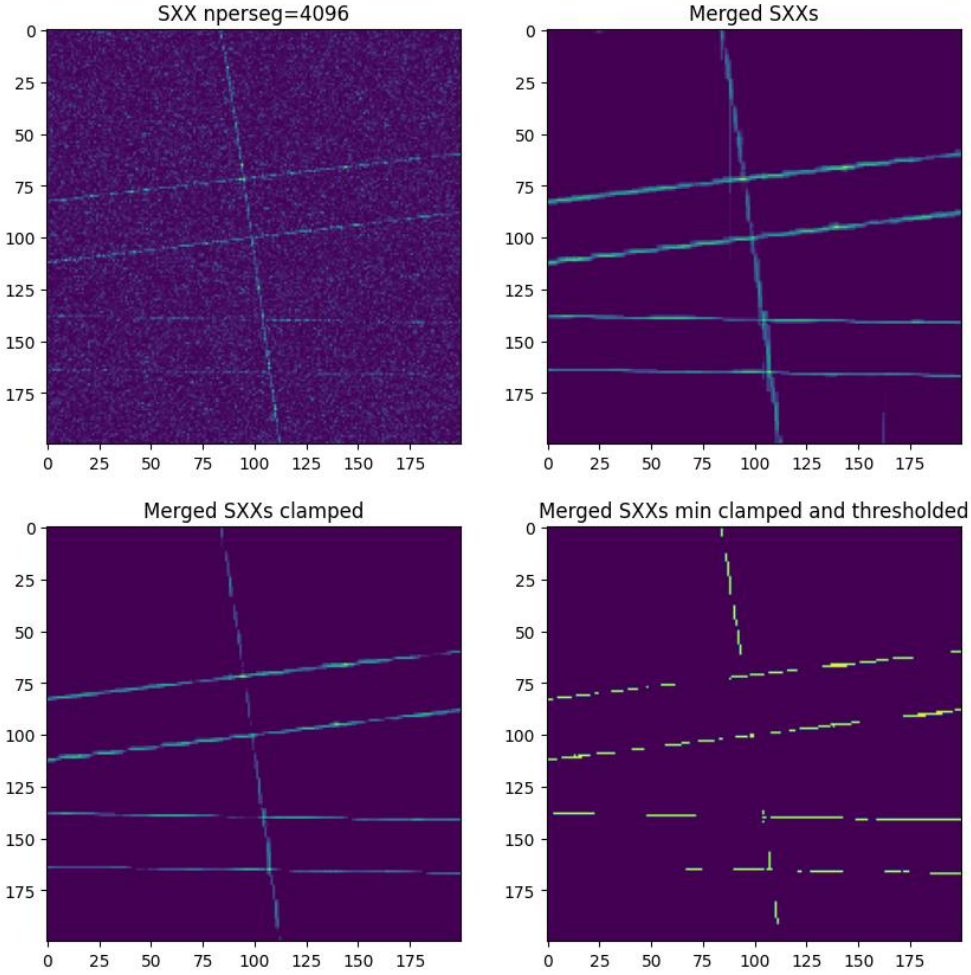

sxxs_targeted_snr=21dB_202.pt
SXX nperseg=4096
Merged SXXs
Merged SXXs clamped
Merged SXXs min clamped and thresholded
0
25
50
75
100
125
150
175

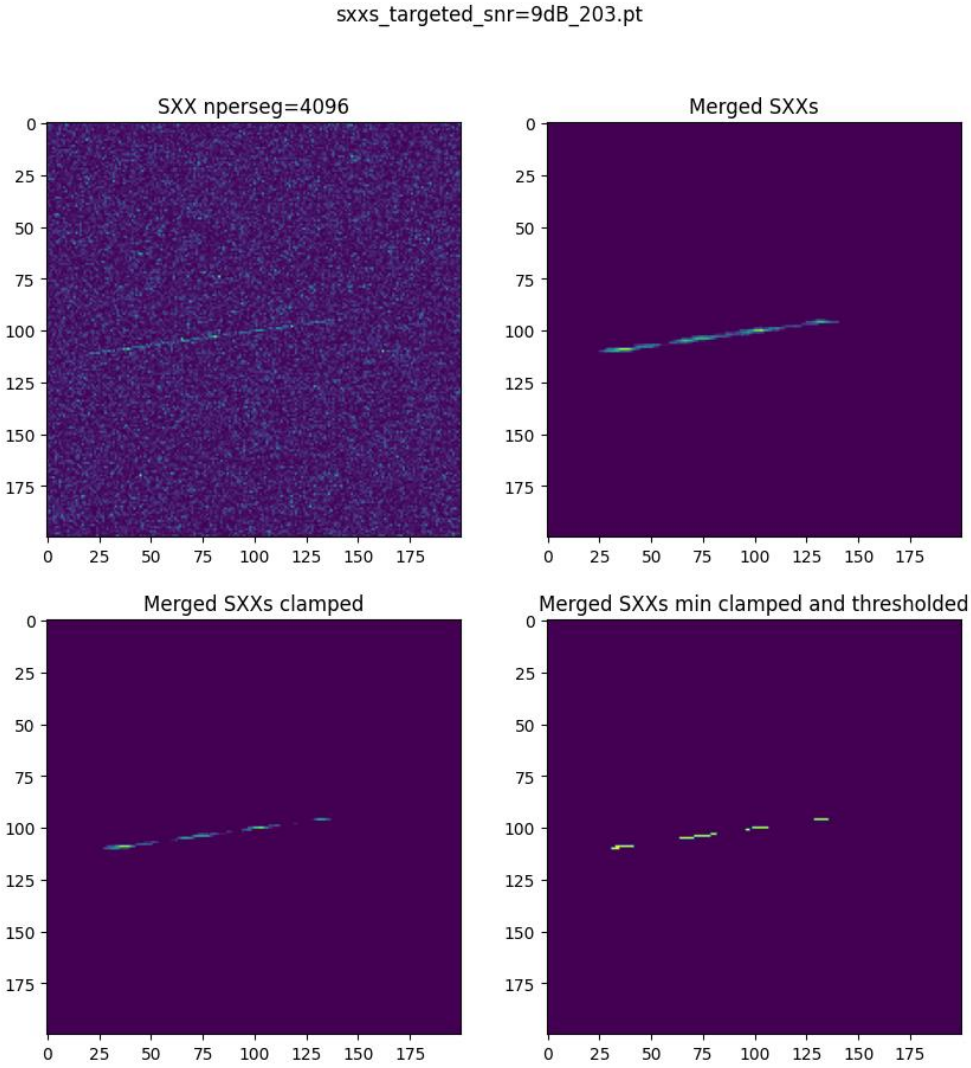

sxxs_targeted_snr=9dB_203.pt
SXX nperseg=4096
Merged SXXs
Merged SXXs clamped
Merged SXXs min clamped and thresholded
0
25
50
75
100
125
150
175

sxxs_targeted_snr=9dB_202.pt

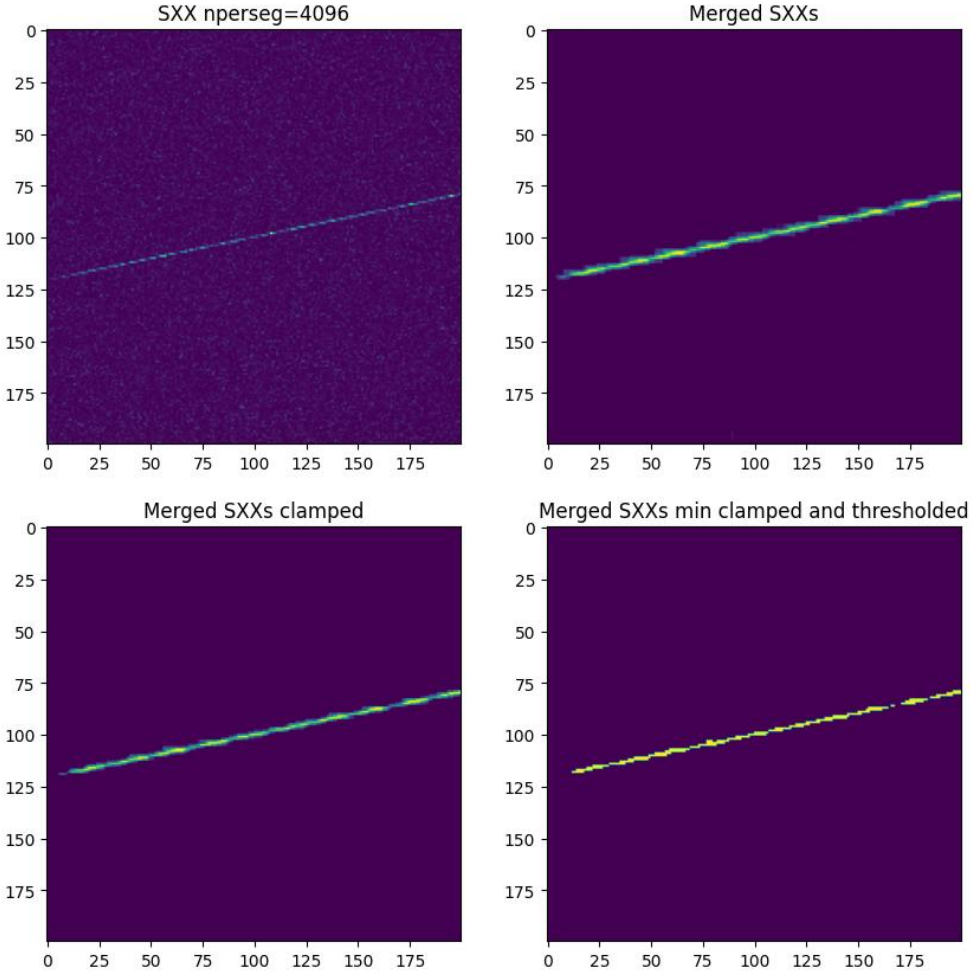


sxxs_targeted_snr=11dB_207.pt

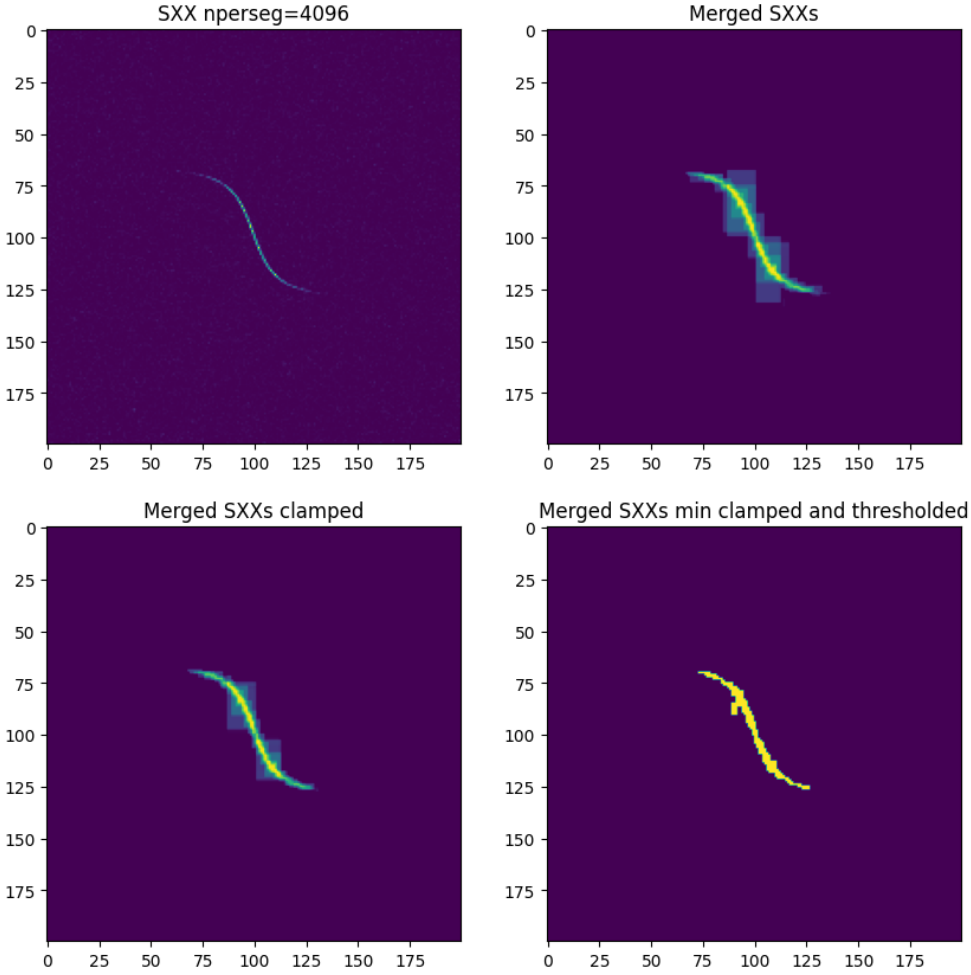



sxxs_targeted_snr=9dB_203.pt
SXX nperseg=4096
Merged SXXs
Merged SXXs clamped
Merged SXXs min clamped and thresholded
0
25
50
75
100
125
150
175

sxxs_targeted_snr=14dB_213.pt



sxxs_targeted_snr=21dB_203.pt



Algo de création masque final : Zhang-Suen Algorithm

P_9	P_2	P_3
P_8	P_1	P_4
P_7	P_6	P_5

Algorithme :

Jusqu'à convergence:

Pour chaque pixel P_1

Si $P_1 == 1$

&

(a) $2 <= \text{sum}(P_i \mid i=2;\ldots;9) <= 6$

&

(b) $\text{sum}((P_i, P_{i+1}) == (0, 1)) == 1 \mid (i=2;\ldots;8))$

&

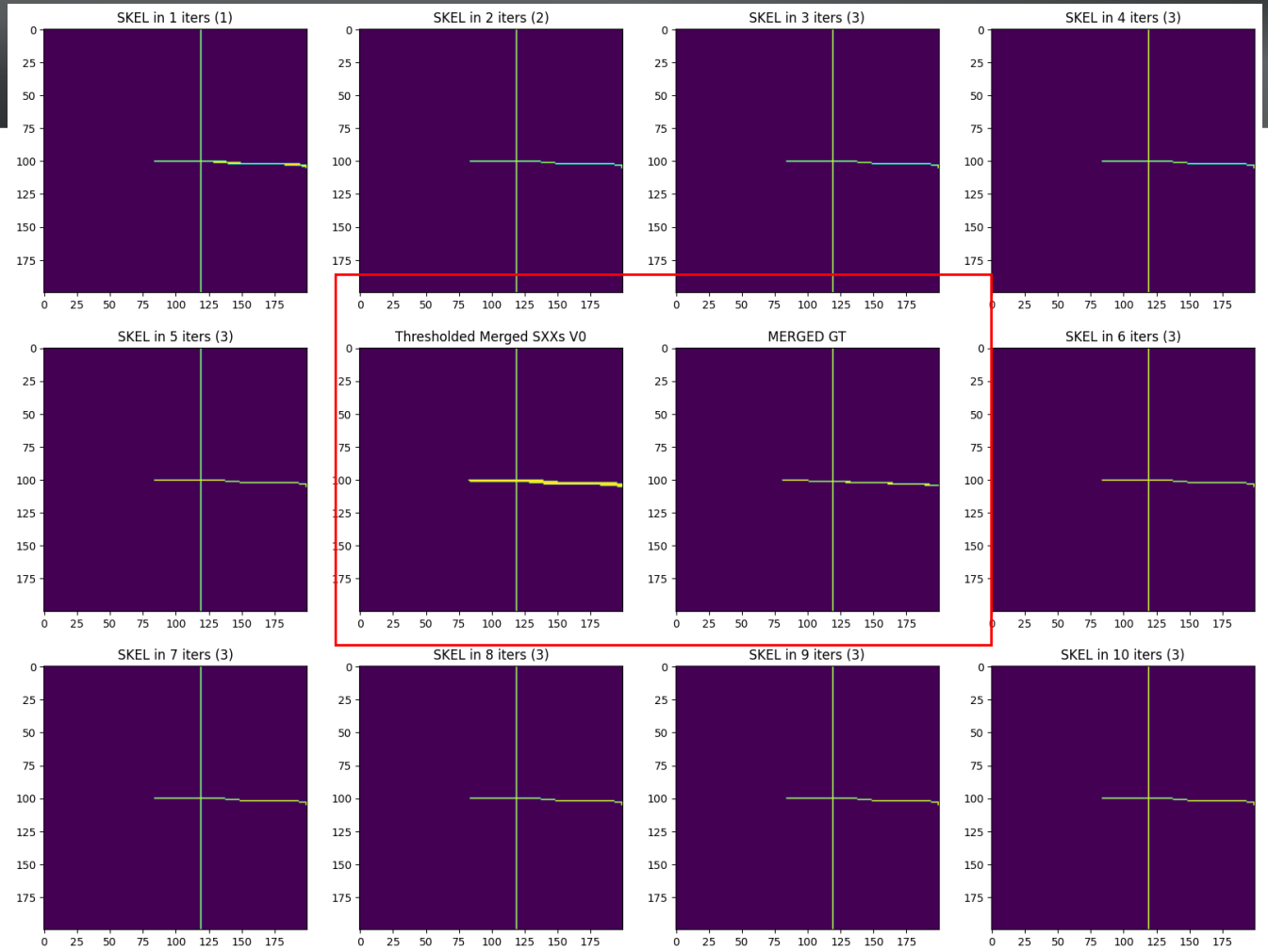
(c) $P_2 x P_4 x P_6 == 0$ (if step even) $P_2 x P_4 x P_8 == 0$ (otherwise)

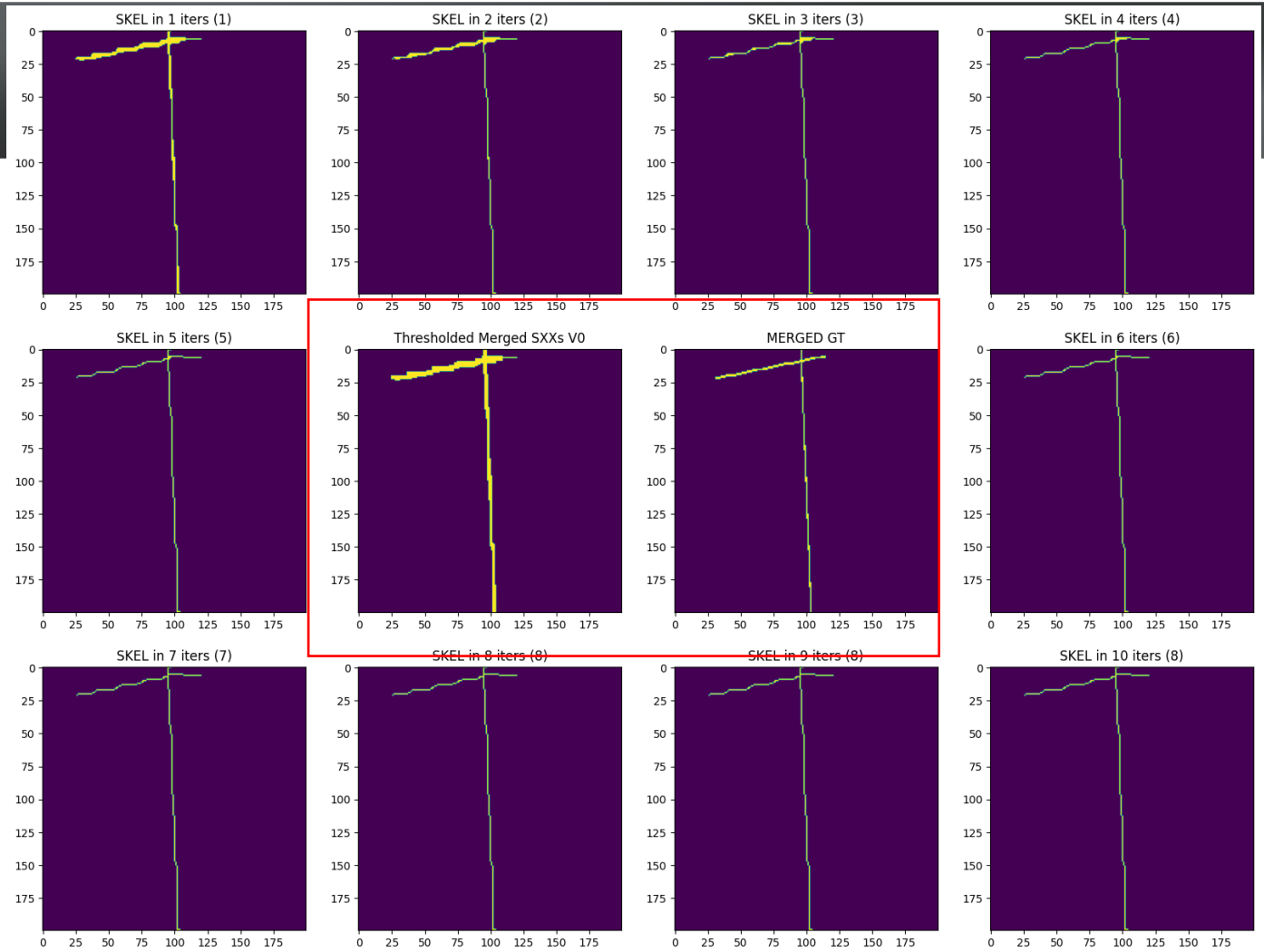
&

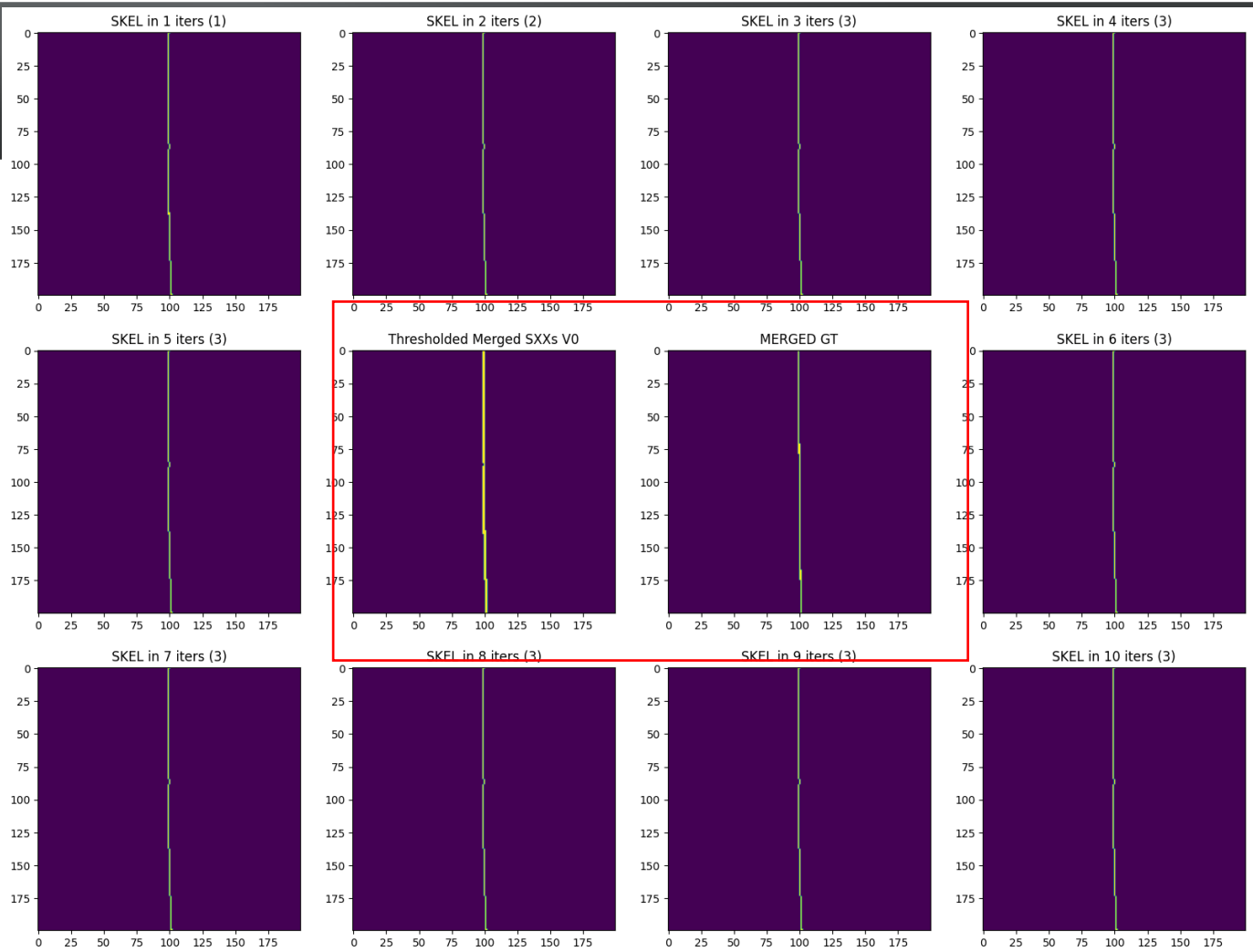
(d) $P_4 x P_6 x P_8 == 0$ (if step even) $P_2 x P_6 x P_8 == 0$ (otherwise)

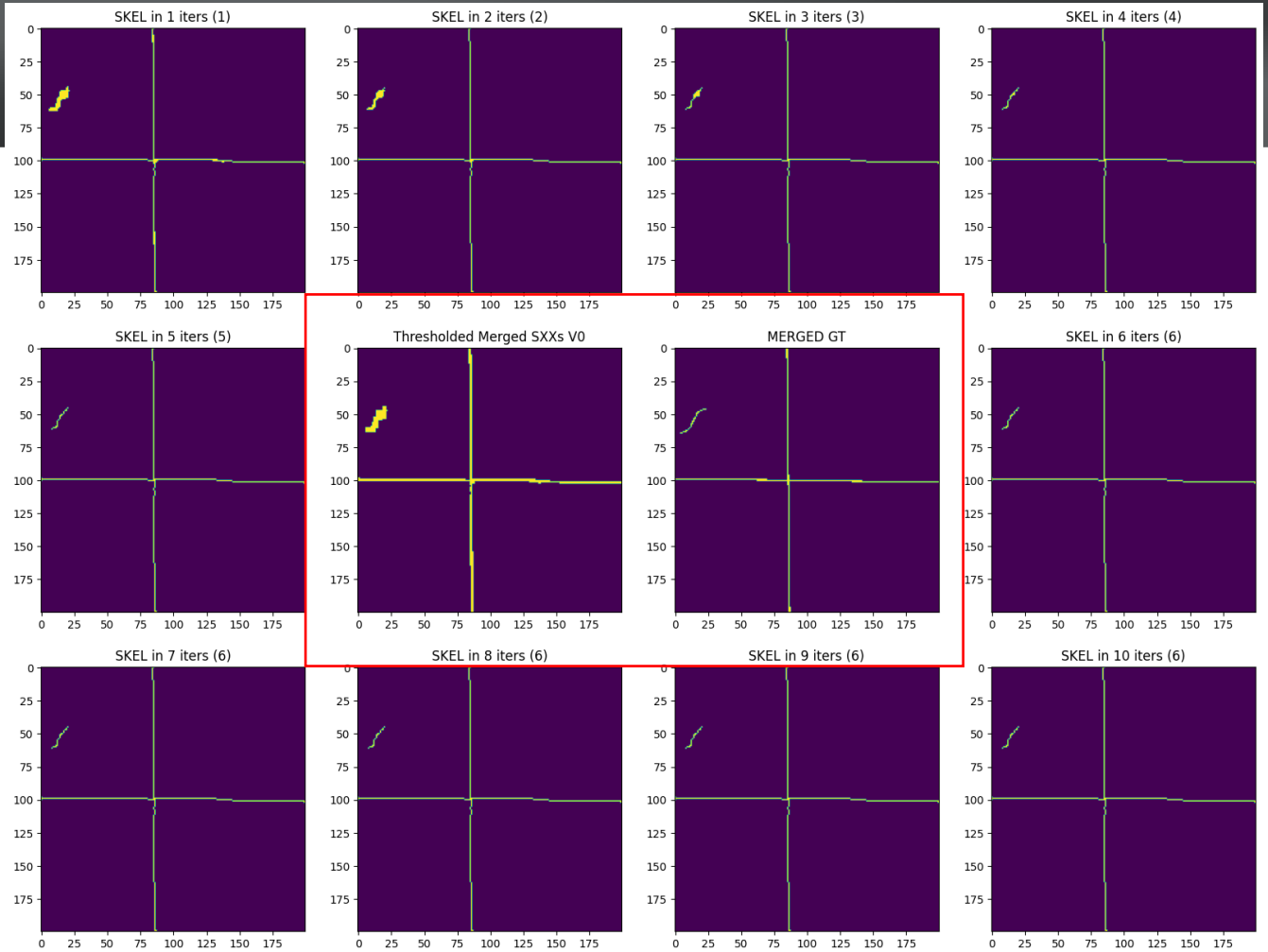
Alors *P0 <- 0*

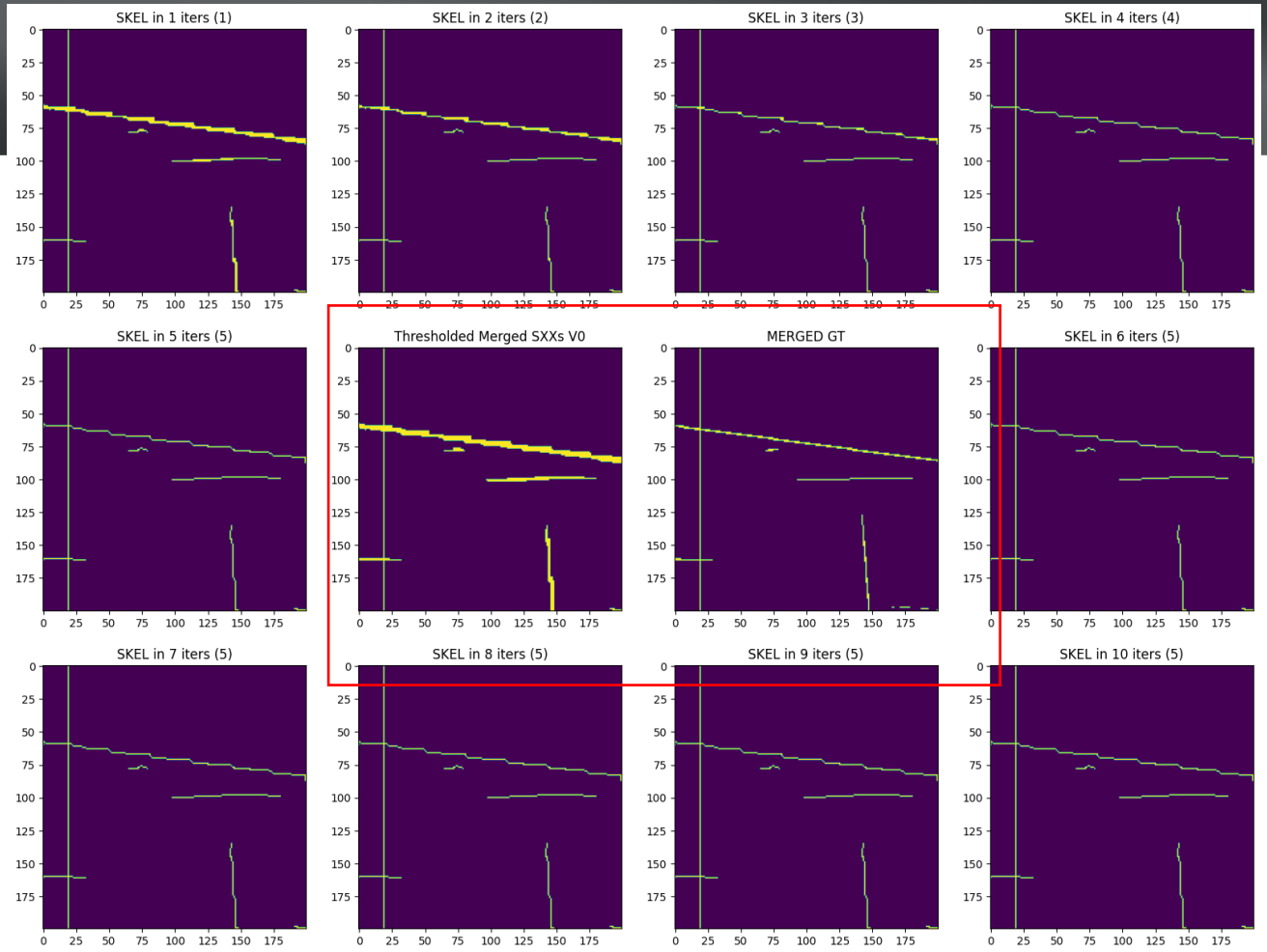
A fast parallel algorithm for thinning digital patterns

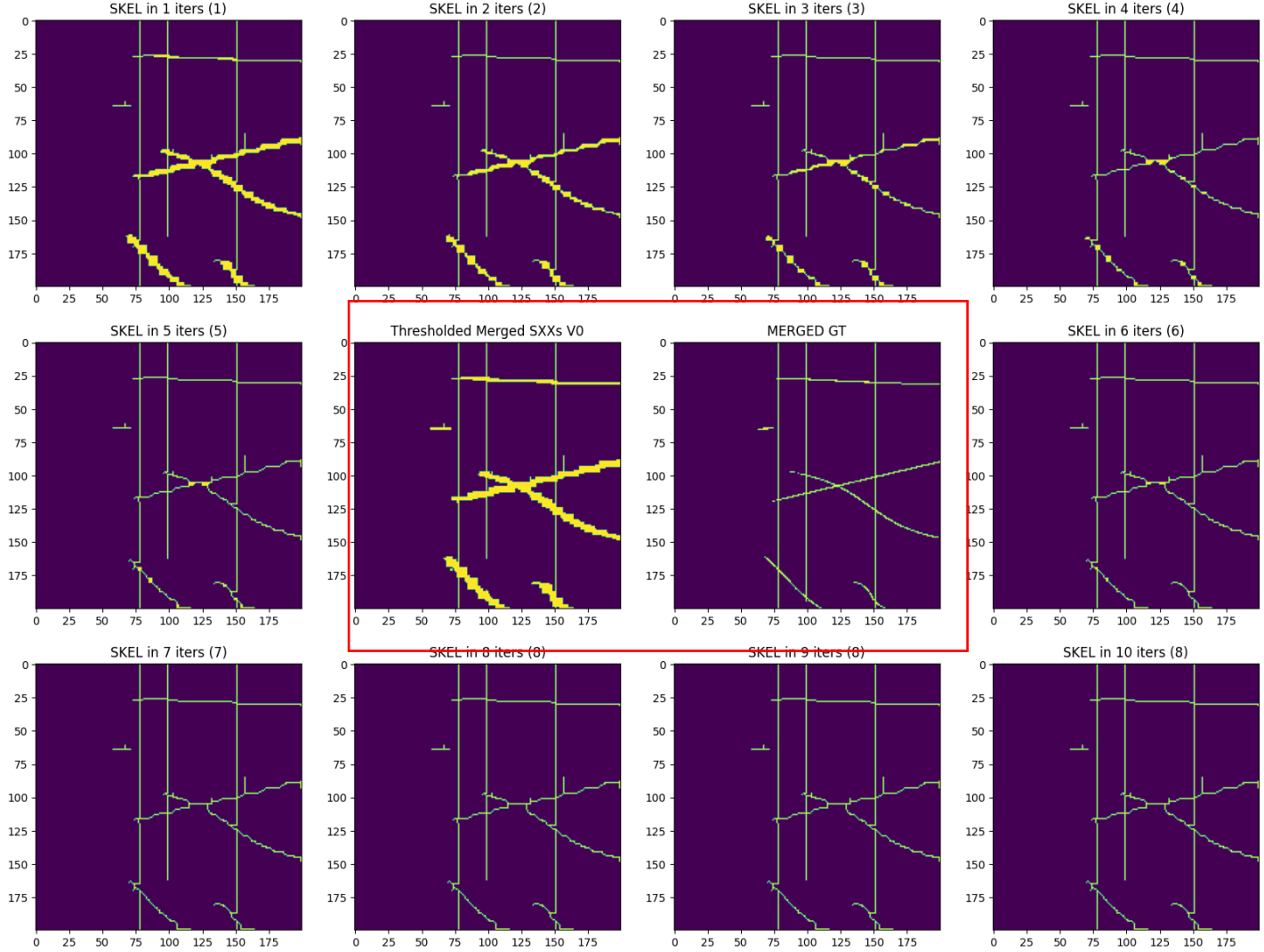

SKEL in 1 iters (1)
SKEL in 2 iters (2)
SKEL in 3 iters (3)
SKEL in 4 iters (3)
SKEL in 5 iters (3)
Thresholded Merged SXXs V0
MERGED GT
SKEL in 6 iters (3)
SKEL in 7 iters (3)
SKEL in 8 iters (3)
SKEL in 9 iters (3)
SKEL in 10 iters (3)

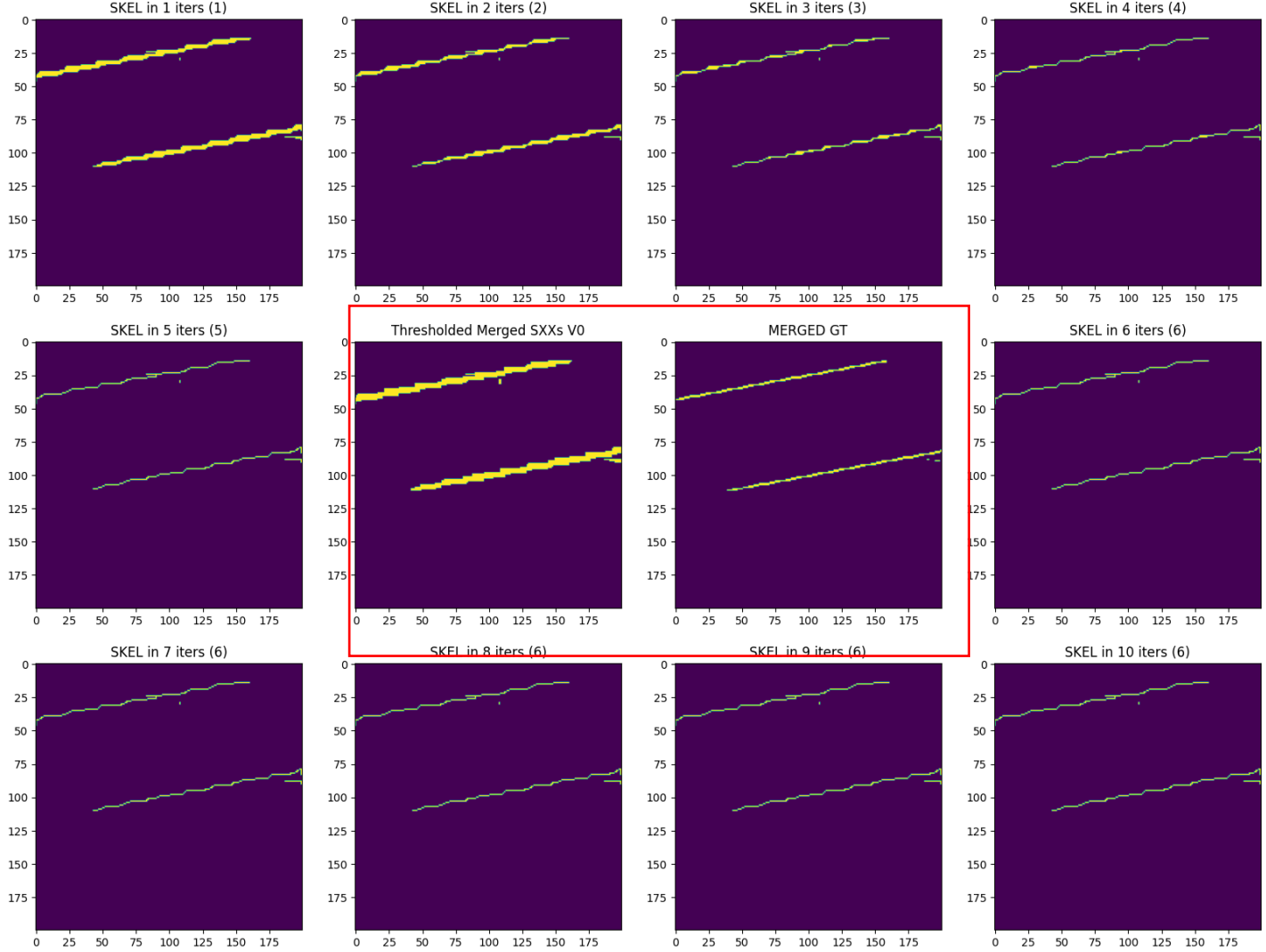

SKEL in 1 iters (1)
SKEL in 2 iters (2)
SKEL in 3 iters (3)
SKEL in 4 iters (4)
SKEL in 5 iters (5)
Thresholded Merged SXXs V0
MERGED GT
SKEL in 6 iters (6)
SKEL in 7 iters (7)
SKEL in 8 iters (8)
SKEL in 9 iters (8)
SKEL in 10 iters (8)


SKEL in 1 iters (1)
SKEL in 2 iters (2)
SKEL in 3 iters (3)
SKEL in 4 iters (3)
SKEL in 5 iters (3)
Thresholded Merged SXXs V0
MERGED GT
SKEL in 6 iters (3)
SKEL in 7 iters (3)
SKEL in 8 iters (3)
SKEL in 9 iters (3)
SKEL in 10 iters (3)


SKEL in 1 iters (1)
SKEL in 2 iters (2)
SKEL in 3 iters (3)
SKEL in 4 iters (4)
SKEL in 5 iters (5)
Thresholded Merged SXXs V0
MERGED GT
SKEL in 6 iters (6)
SKEL in 7 iters (6)
SKEL in 8 iters (6)
SKEL in 9 iters (6)
SKEL in 10 iters (6)
0 25 50 75 100 125 150 175


SKEL in 1 iters (1)
SKEL in 2 iters (2)
SKEL in 3 iters (3)
SKEL in 4 iters (4)
SKEL in 5 iters (5)
Thresholded Merged SXXs V0
MERGED GT
SKEL in 6 iters (5)
SKEL in 7 iters (5)
SKEL in 8 iters (5)
SKEL in 9 iters (5)
SKEL in 10 iters (5)


SKEL in 1 iters (1)
SKEL in 2 iters (2)
SKEL in 3 iters (3)
SKEL in 4 iters (4)
SKEL in 5 iters (5)
Thresholded Merged SXXs V0
MERGED GT
SKEL in 6 iters (6)
SKEL in 7 iters (7)
SKEL in 8 iters (8)
SKEL in 9 iters (8)
SKEL in 10 iters (8)


SKEL in 1 iters (1)
SKEL in 2 iters (2)
SKEL in 3 iters (3)
SKEL in 4 iters (4)
SKEL in 5 iters (5)
Thresholded Merged SXXs V0
MERGED GT
SKEL in 6 iters (6)
SKEL in 7 iters (6)
SKEL in 8 iters (6)
SKEL in 9 iters (6)
SKEL in 10 iters (6)

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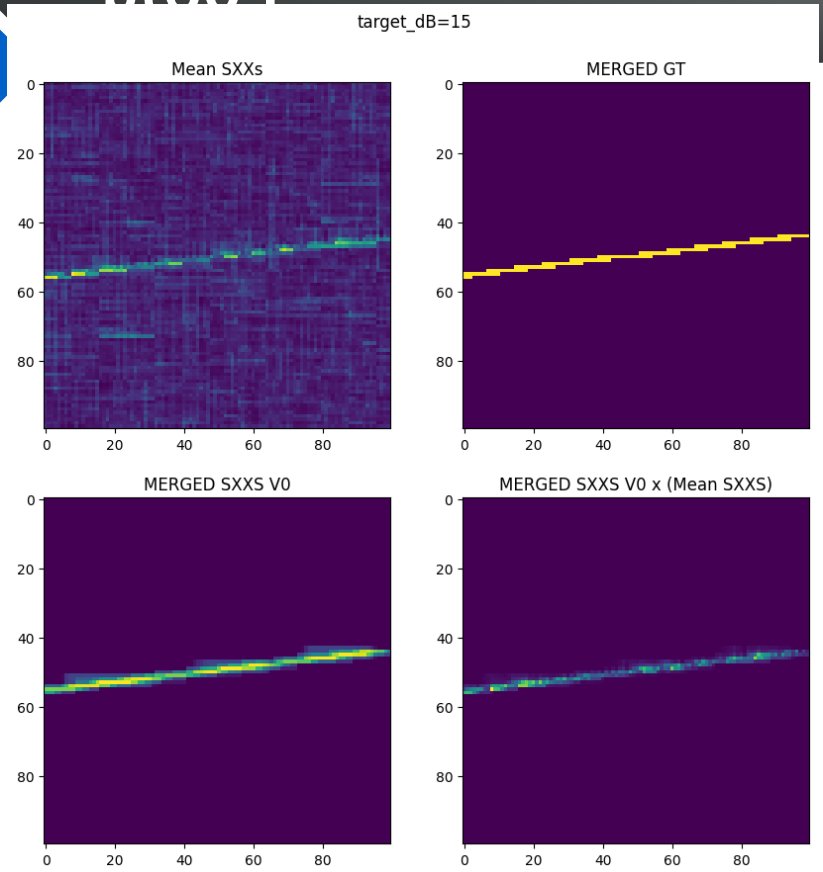
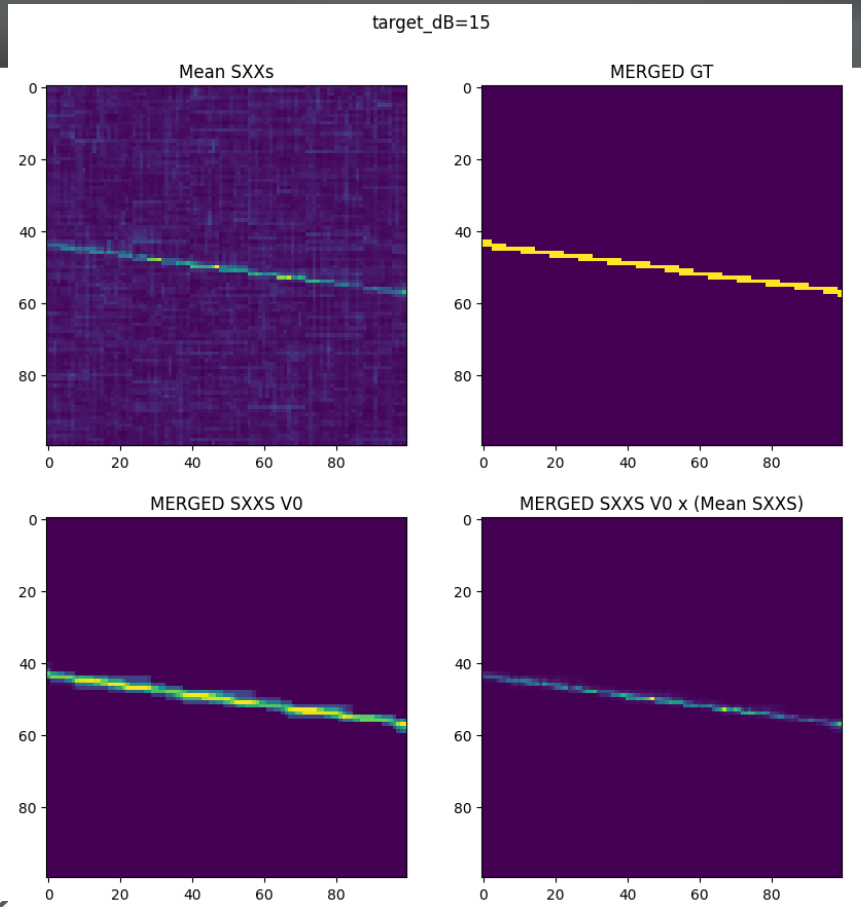
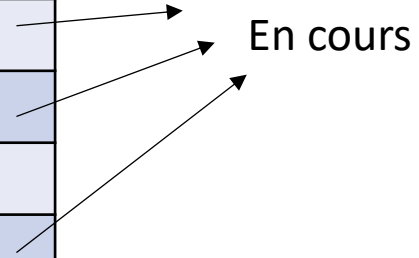

target_dB=15
Mean SXXs
MERGED GT
MERGED SXXS V0
MERGED SXXS V0 x (Mean SXXS)


target_dB=15
Mean SXXs
MERGED GT
MERGED SXXS V0
MERGED SXXS V0 x (Mean SXXS)

Autres travaux

- Fine-tuning des modèles

nperseg	Nombre de couches	num_kernels (num_params)	PR-AUC (%) Avant FT	PR-AUC (%) Après FT
256	6	2	96,6	97,2
512	6	2	94,8	96,4
1024	6	4	95,4	96,7
4096	6	4	96,2	
16384	6	4	95,8	95,4
131072	6	2	95,4	



AVANTIX

MERCI