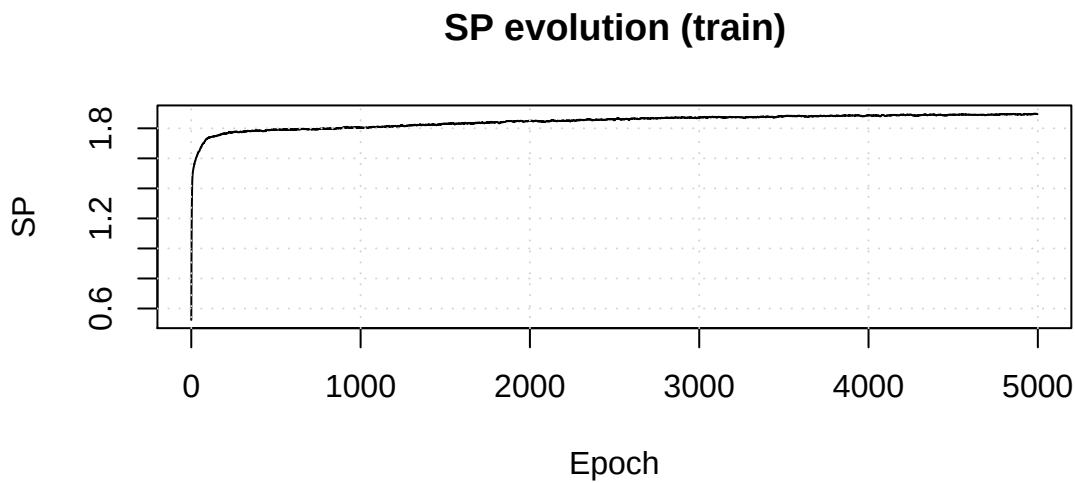
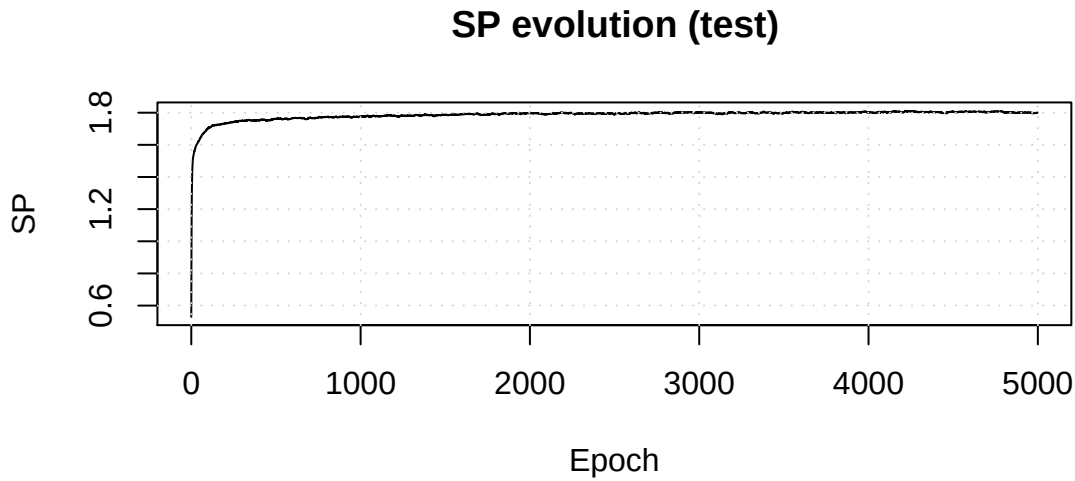
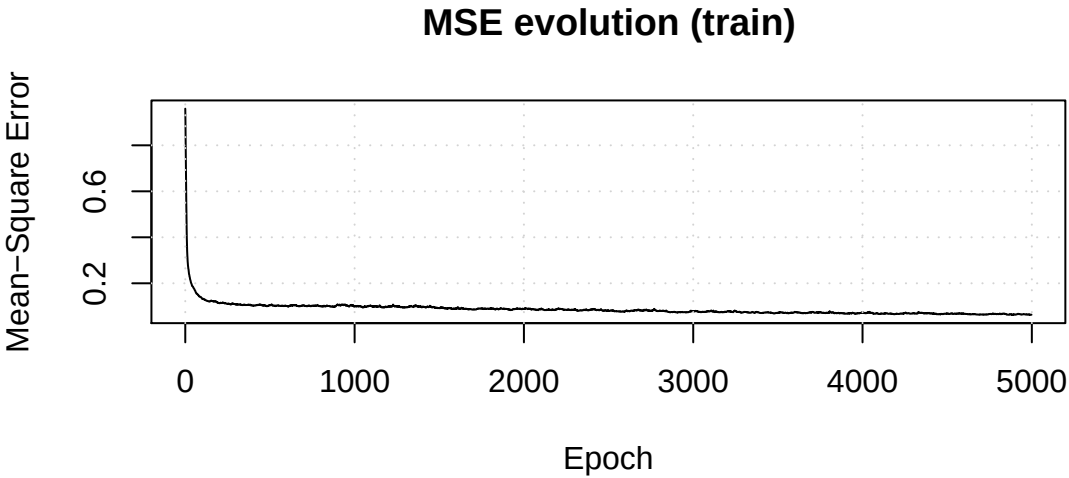
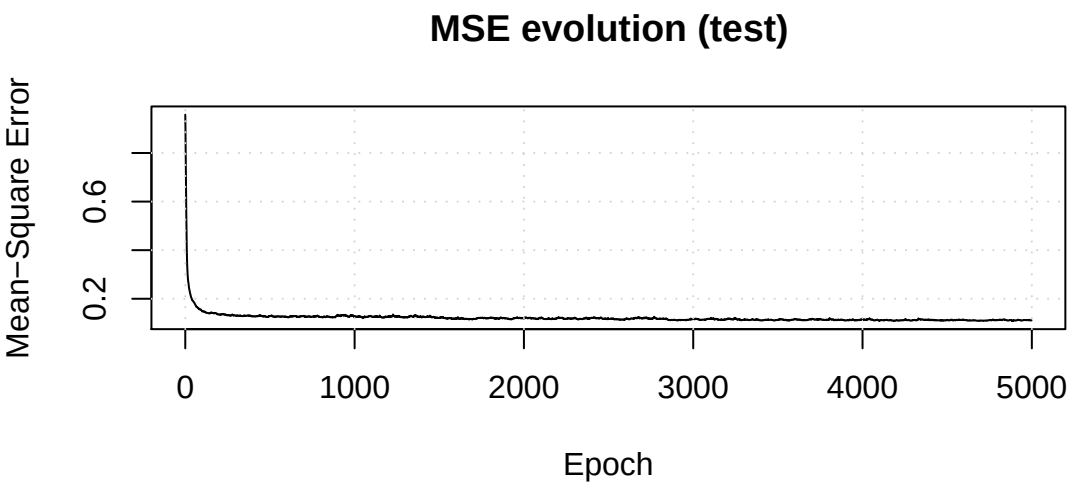
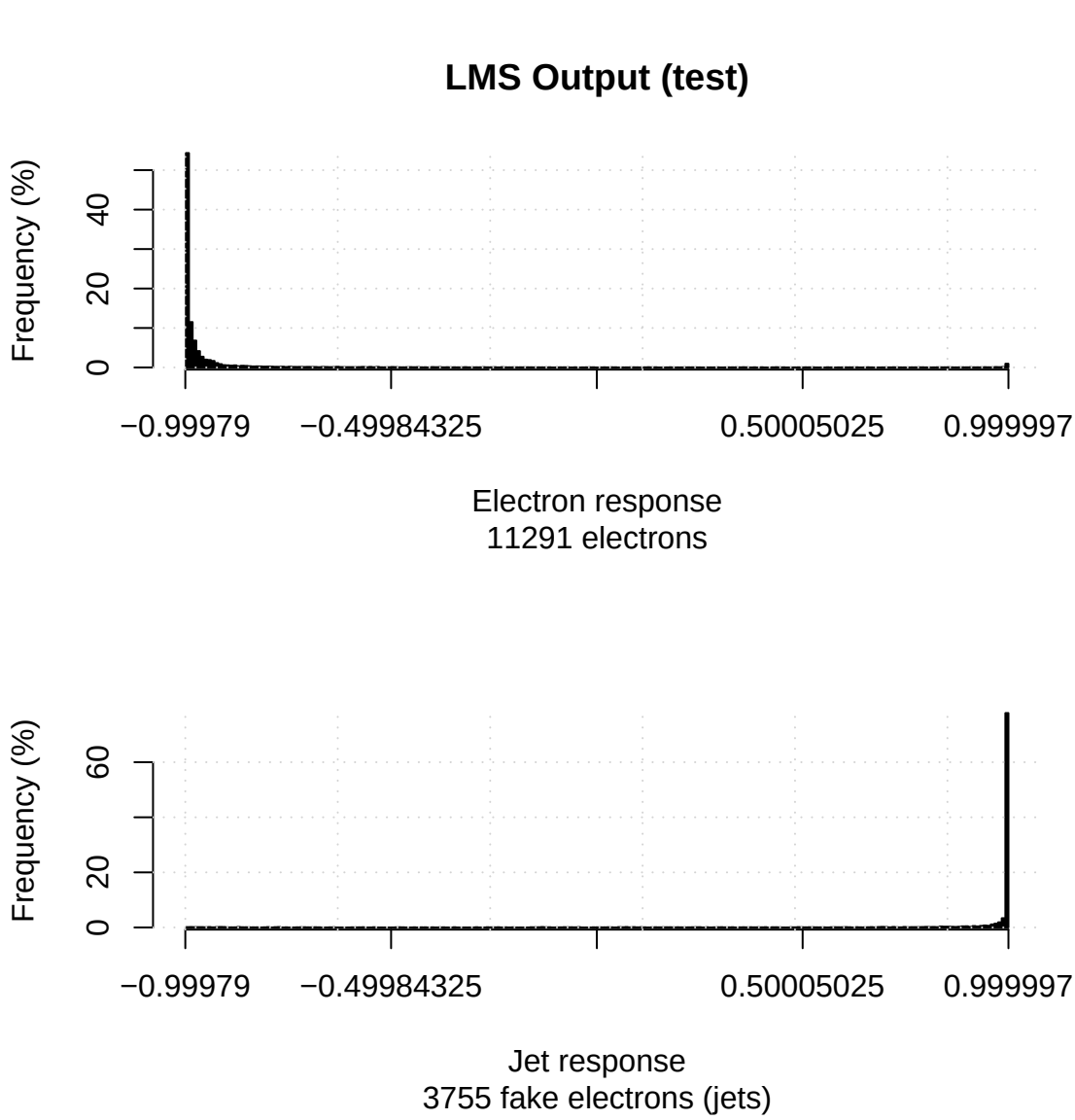
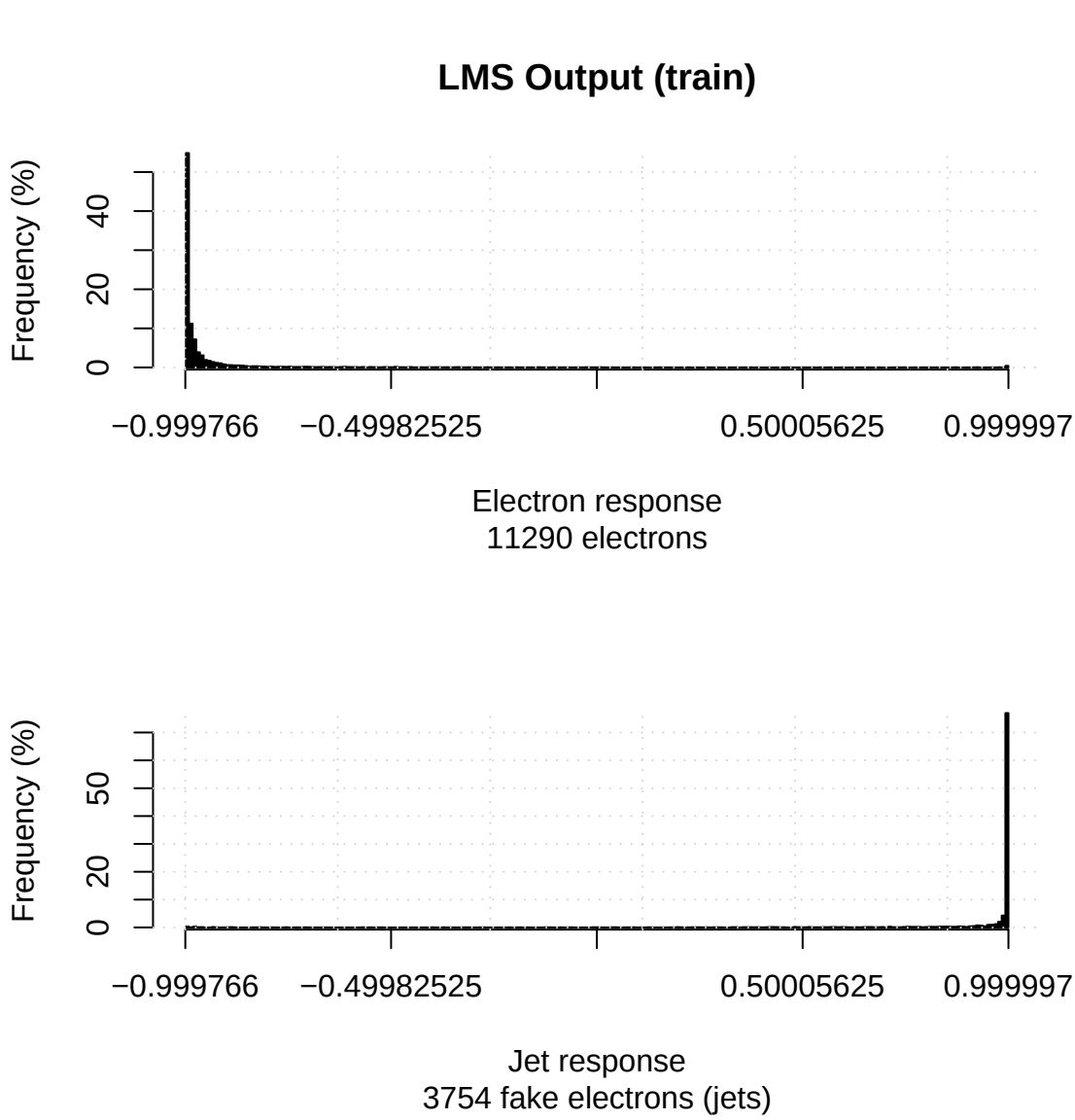

SP evolution (train)
SP
0.6
1.2
1.8
0
1000
2000
3000
4000
5000
Epoch

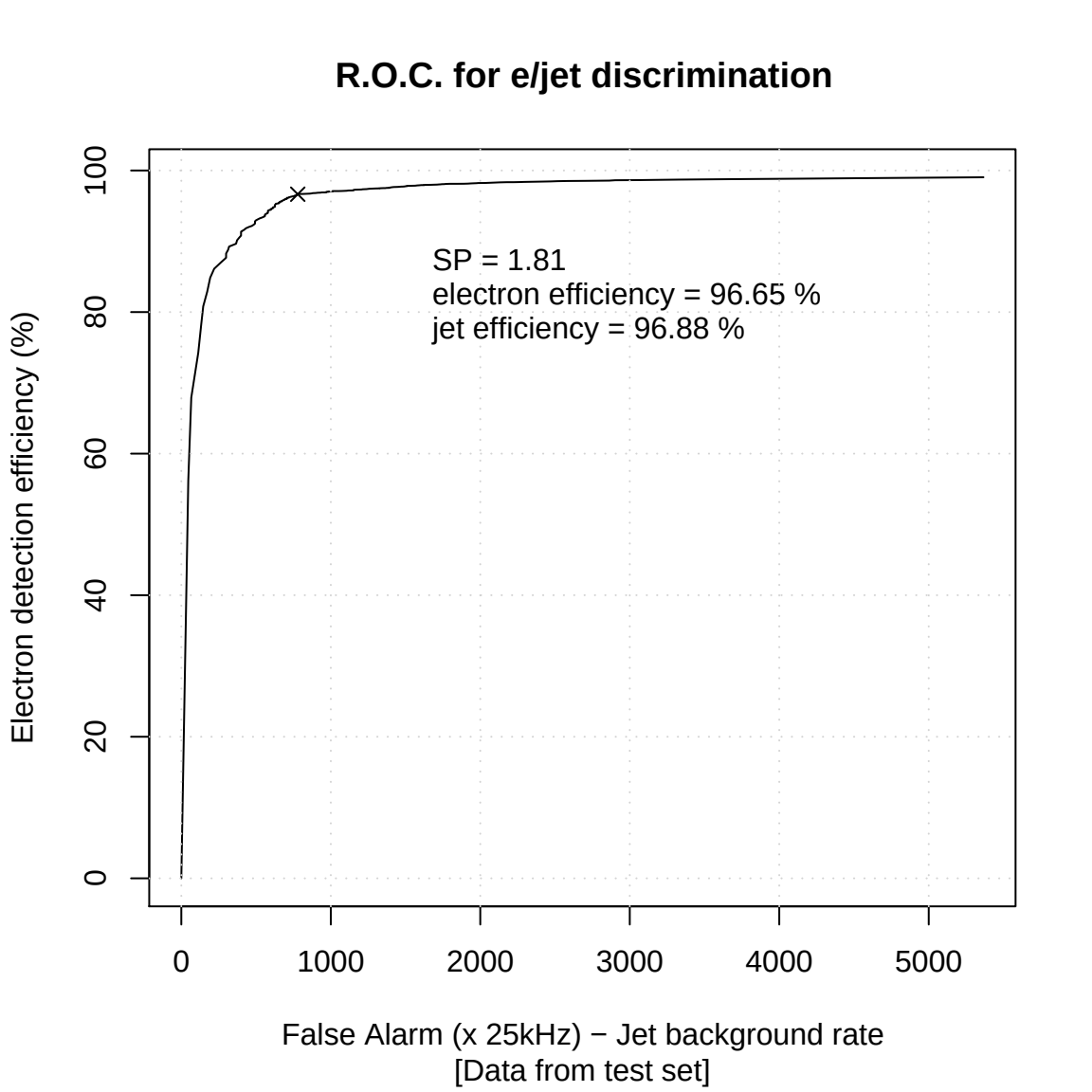

SP evolution (test)
SP
0.6
1.2
1.8
0
1000
2000
3000
4000
5000
Epoch

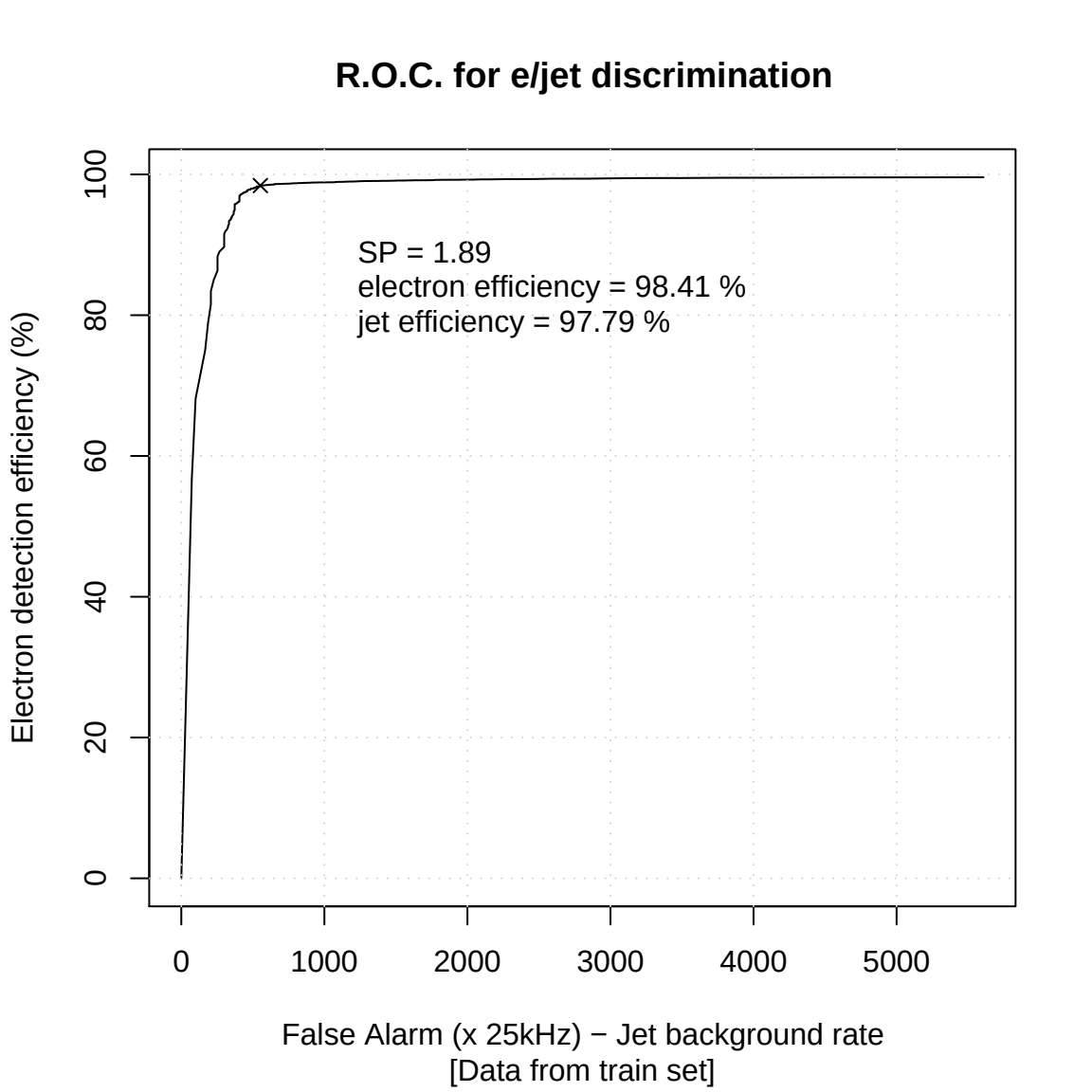

MSE evolution (train)
Mean−Square Error
0.2
0.6
0
1000
2000
3000
4000
5000
Epoch

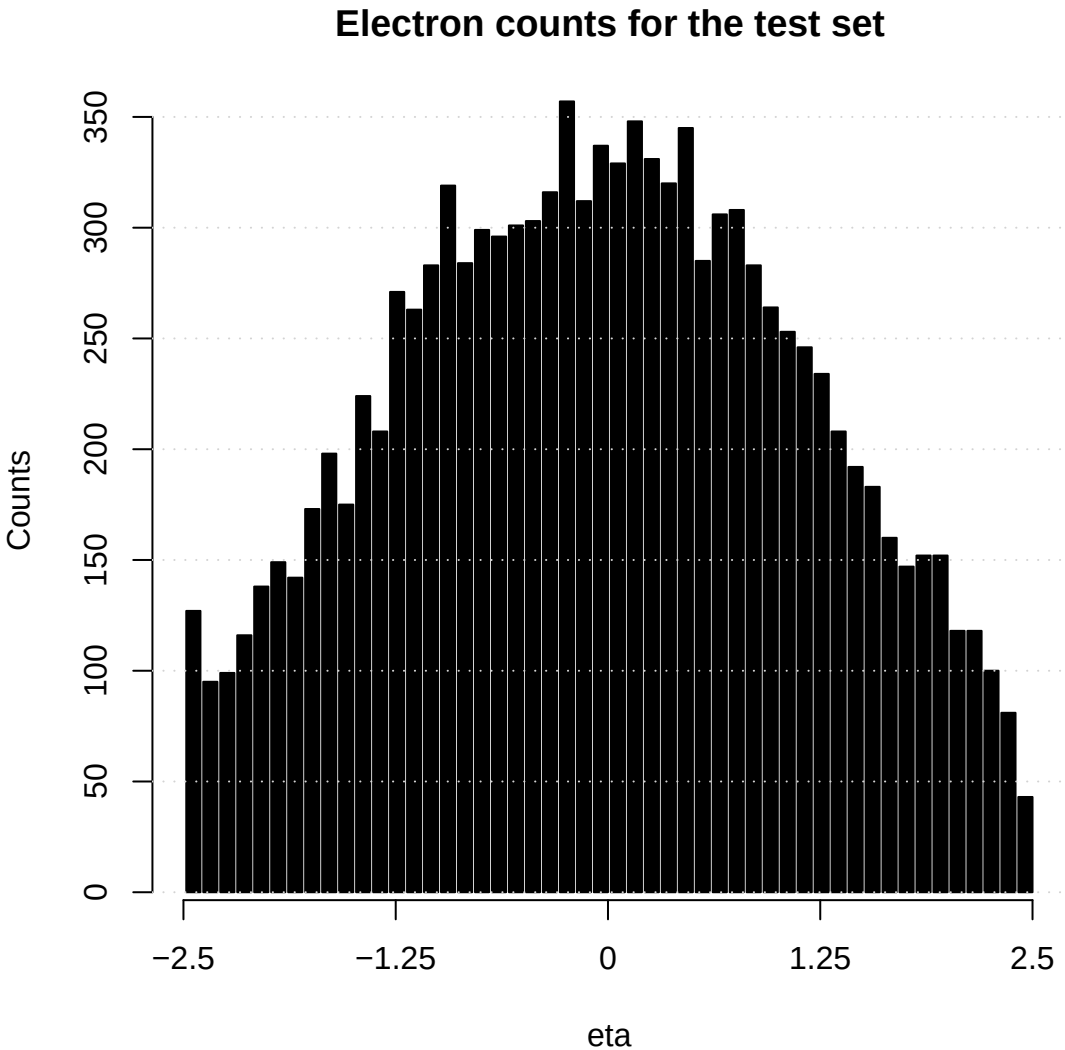

MSE evolution (test)
Mean−Square Error
0.2
0.6
0
1000
2000
3000
4000
5000
Epoch

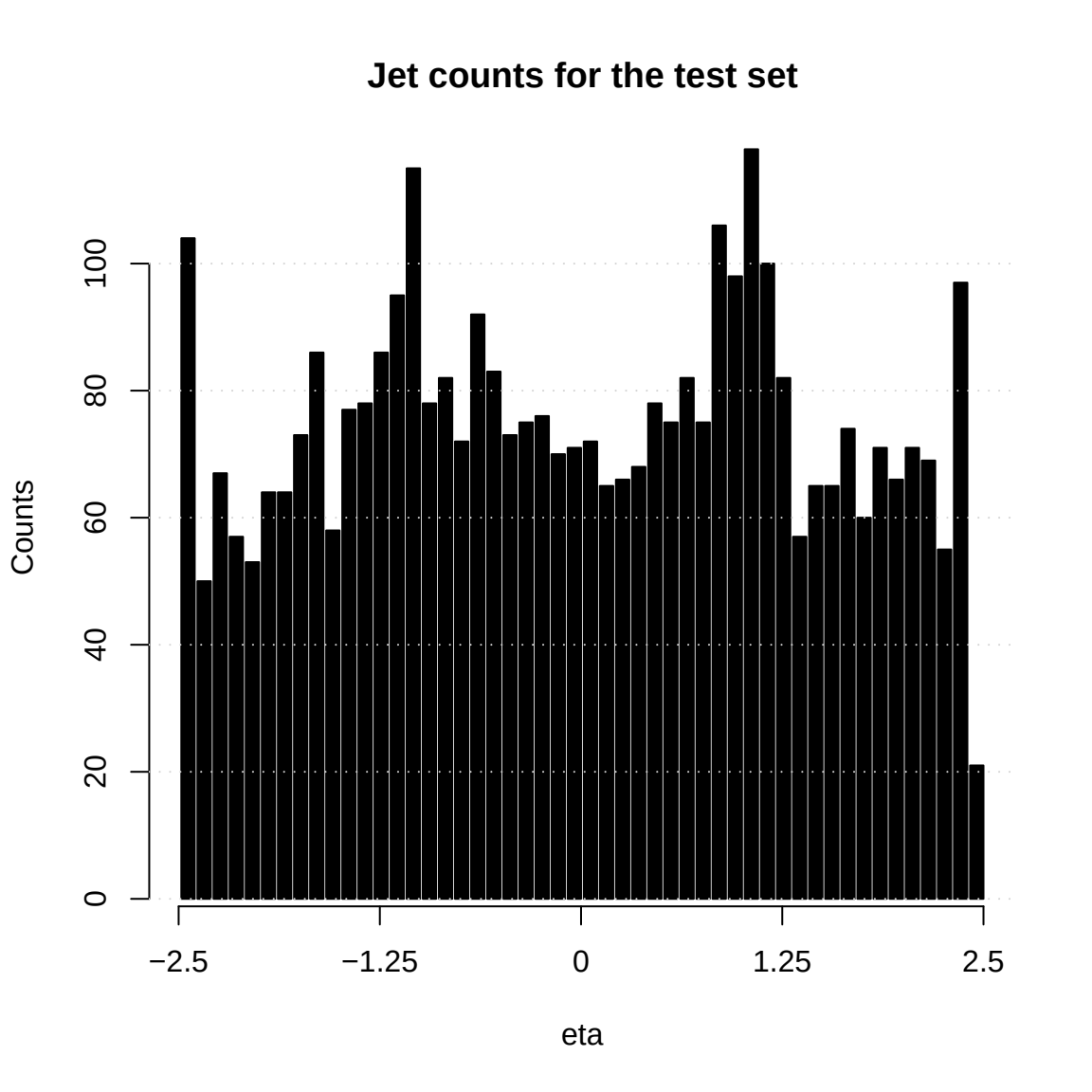

LMS Output (test)
Frequency (%)
0
20
40
−0.99979
−0.49984325
0.50005025
0.999997
Electron response
11291 electrons
Frequency (%)
0
20
60
−0.99979
−0.49984325
0.50005025
0.999997
Jet response
3755 fake electrons (jets)

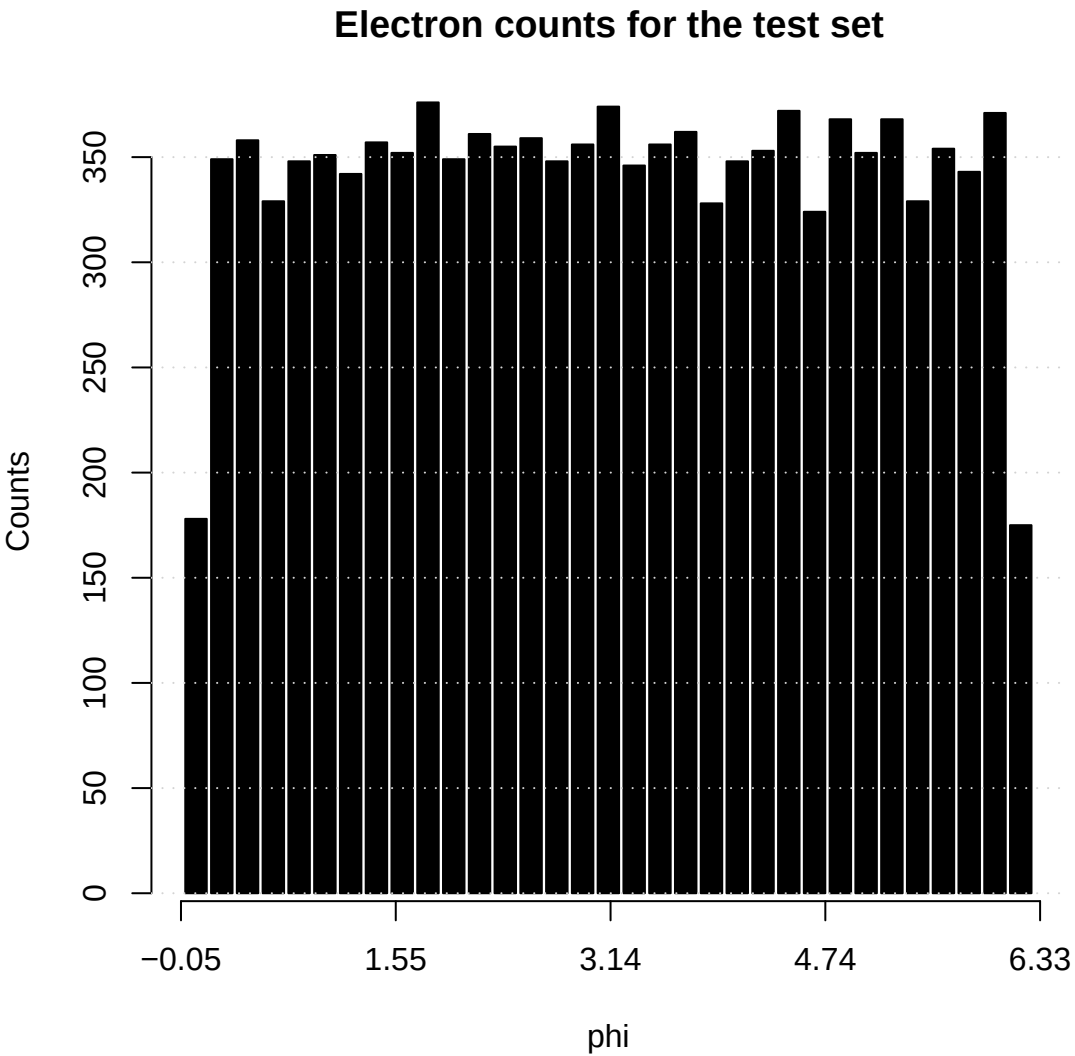

LMS Output (train)
Frequency (%)
0
20
40
−0.999766
−0.49982525
0.50005625
0.999997
Electron response
11290 electrons
Frequency (%)
0
20
50
−0.999766
−0.49982525
0.50005625
0.999997
Jet response
3754 fake electrons (jets)

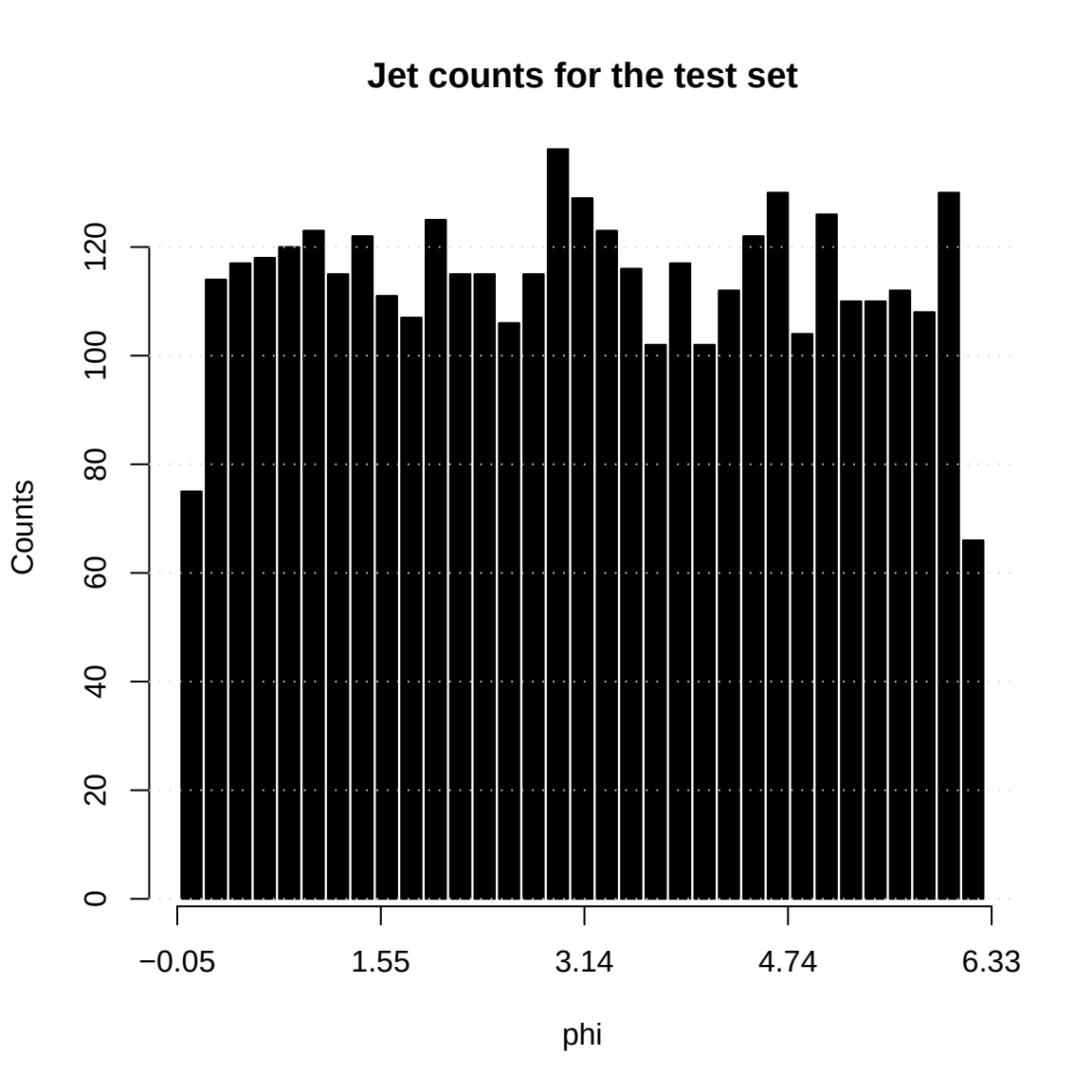

R.O.C. for e/jet discrimination
SP = 1.81
electron efficiency = 96.65 %
jet efficiency = 96.88 %
Electron detection efficiency (%)
0
20
40
60
80
100
0
1000
2000
3000
4000
5000
False Alarm (x 25kHz) − Jet background rate
[Data from test set]

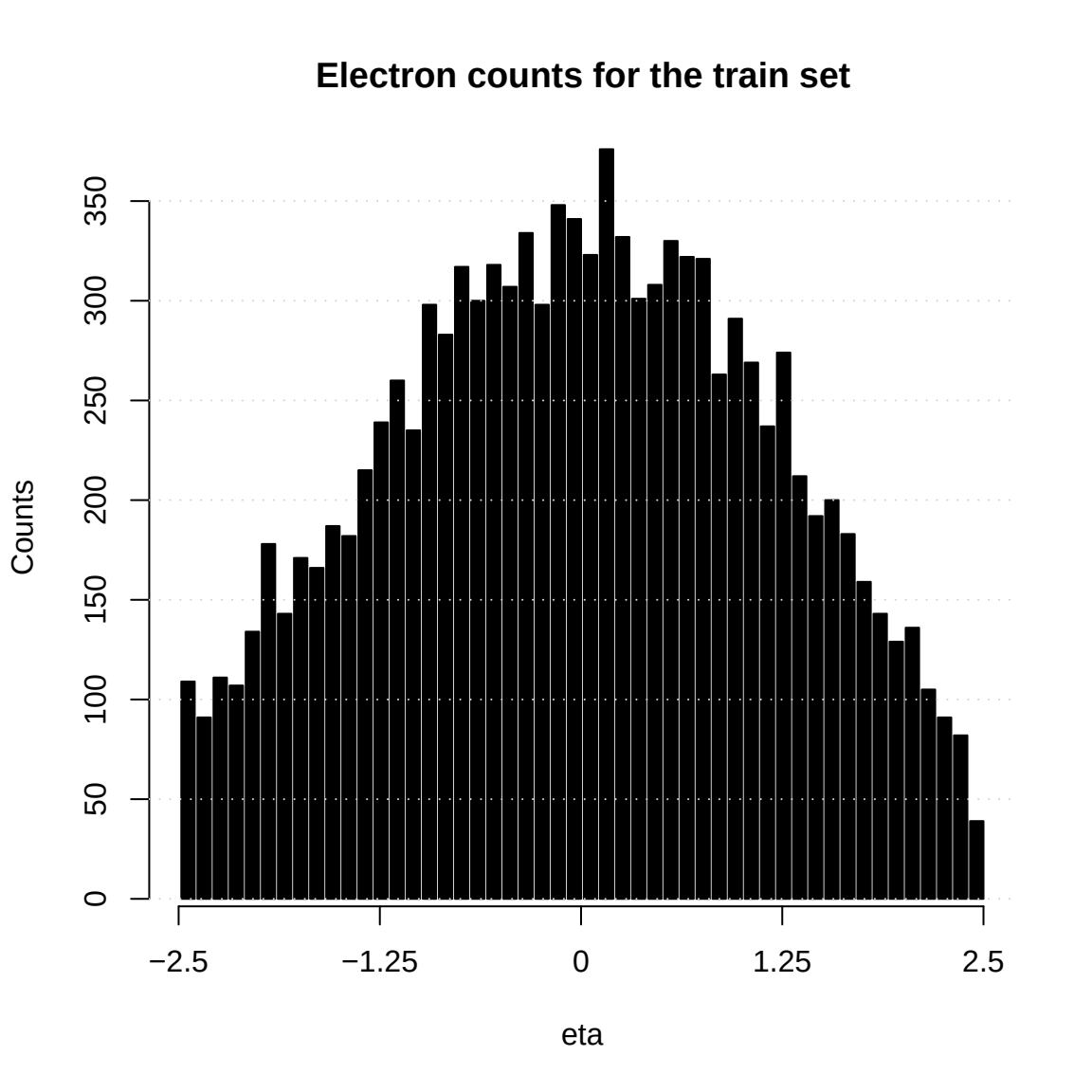

R.O.C. for e/jet discrimination
SP = 1.89
electron efficiency = 98.41 %
jet efficiency = 97.79 %
Electron detection efficiency (%)
0
20
40
60
80
100
0
1000
2000
3000
4000
5000
False Alarm (x 25kHz) − Jet background rate
[Data from train set]

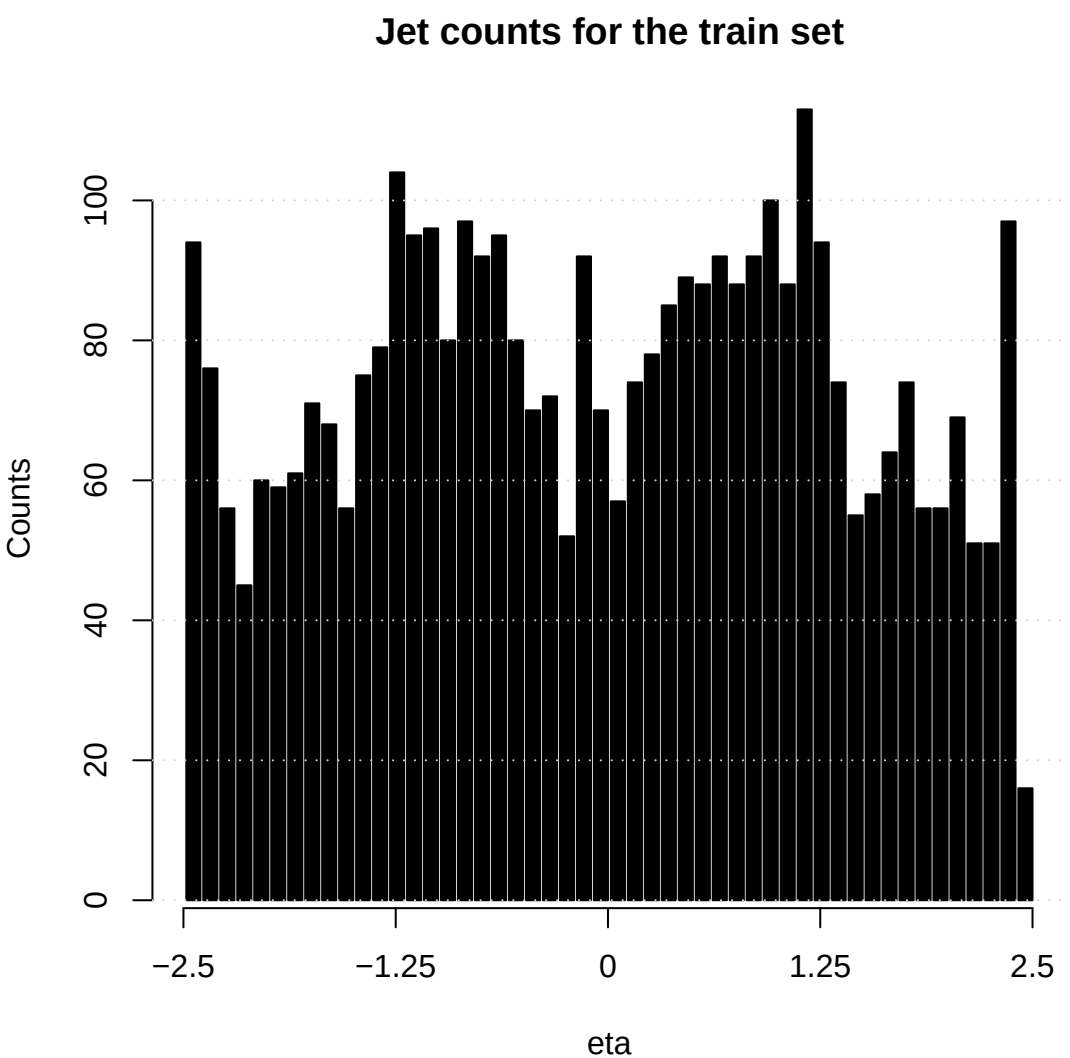

Electron counts for the test set
Counts
0
50
100
150
200
250
300
350
−2.5
−1.25
0
1.25
2.5
eta

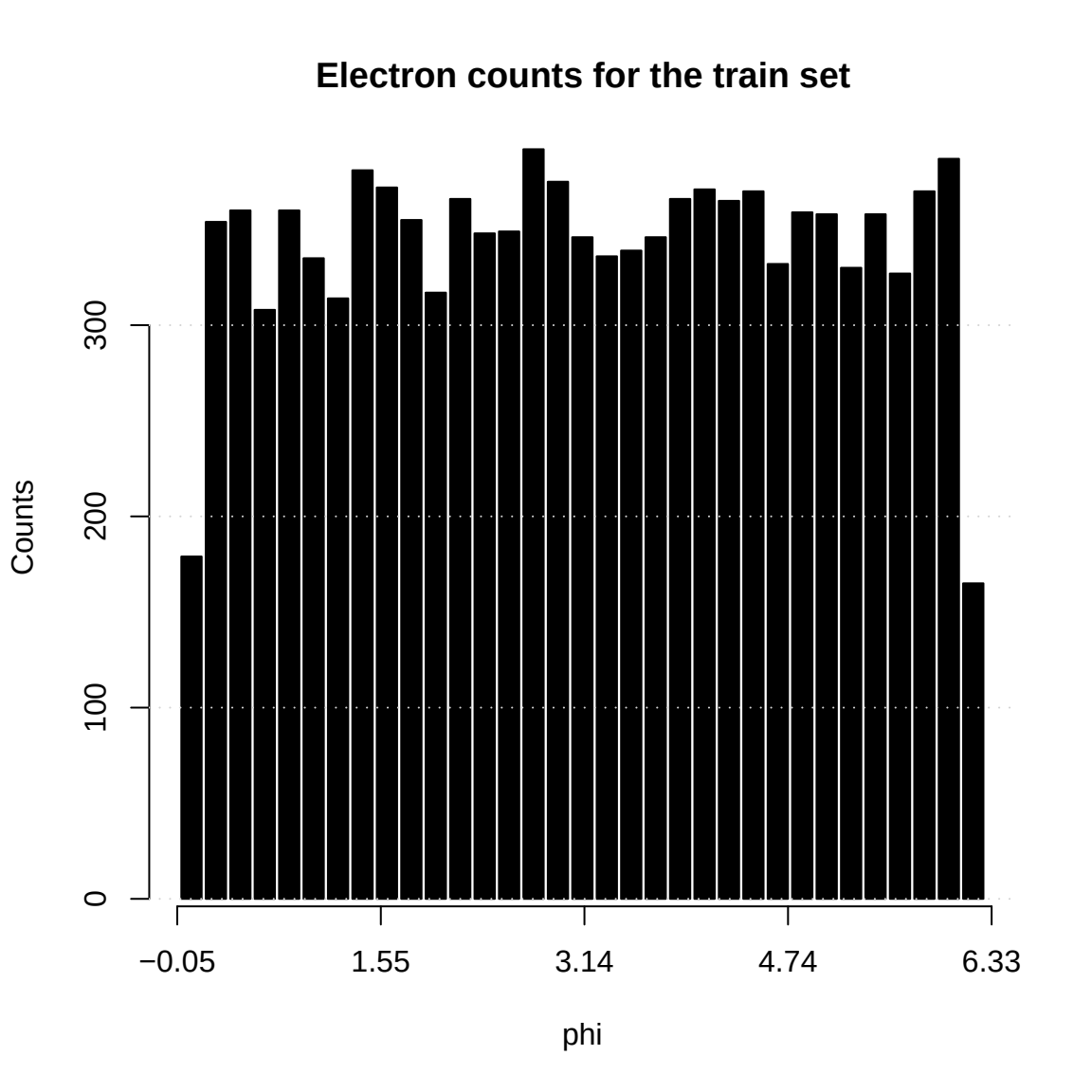

Jet counts for the test set
Counts
0
20
40
60
80
100
−2.5
−1.25
0
1.25
2.5
eta

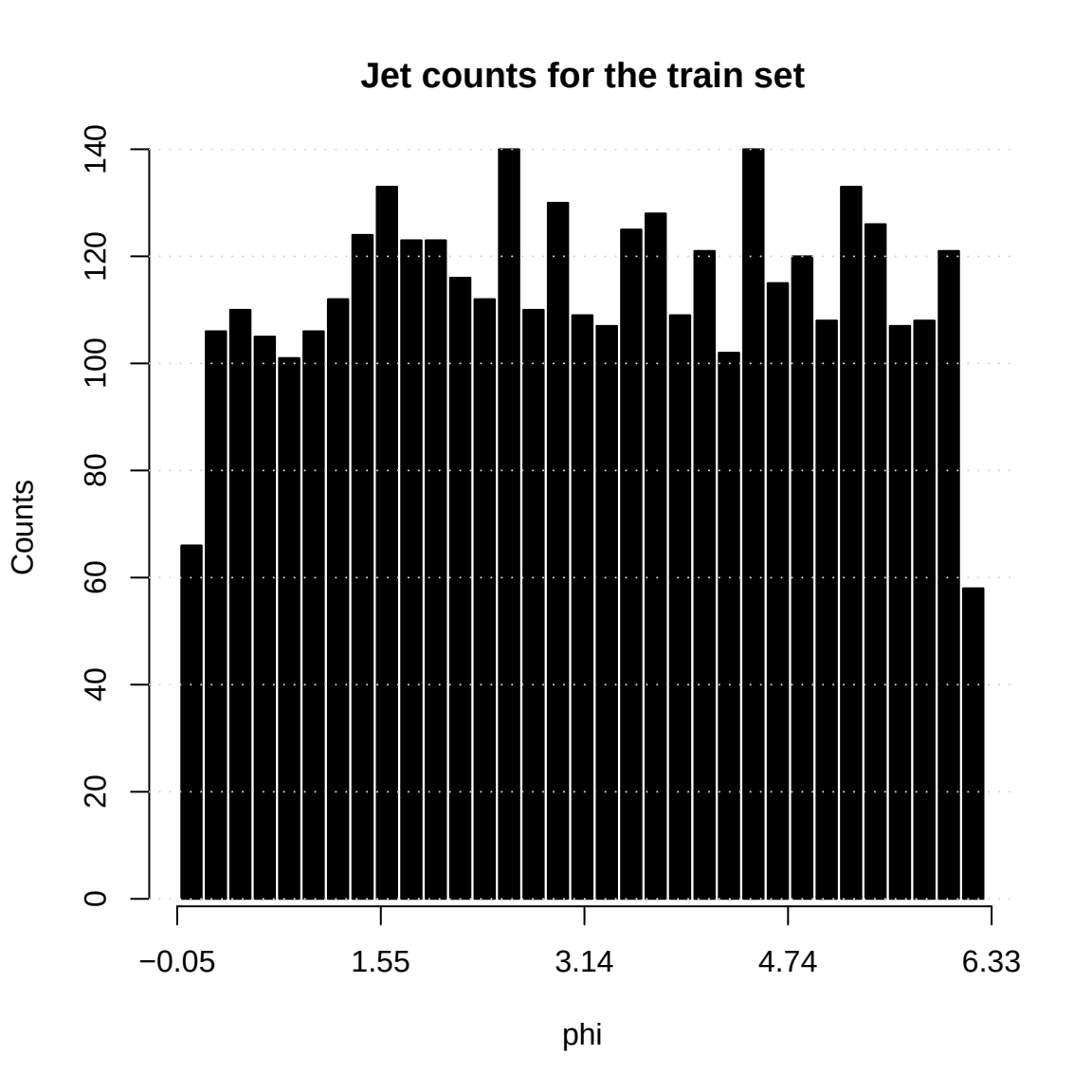

Electron counts for the test set
Counts
0
50
100
150
200
250
300
350
−0.05
1.55
3.14
4.74
6.33
phi

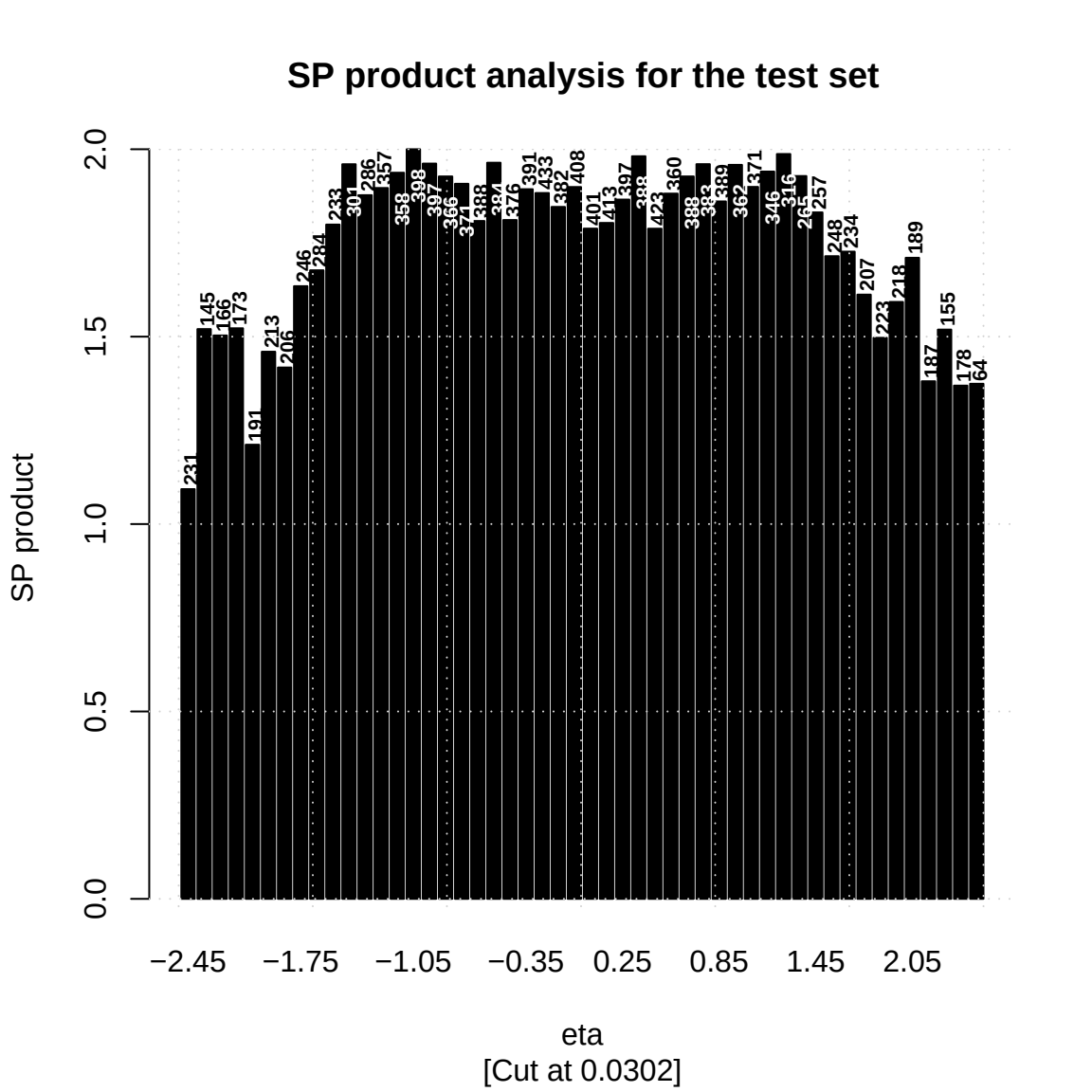

Jet counts for the test set
Counts
0
20
40
60
80
100
120
−0.05
1.55
3.14
4.74
6.33
phi

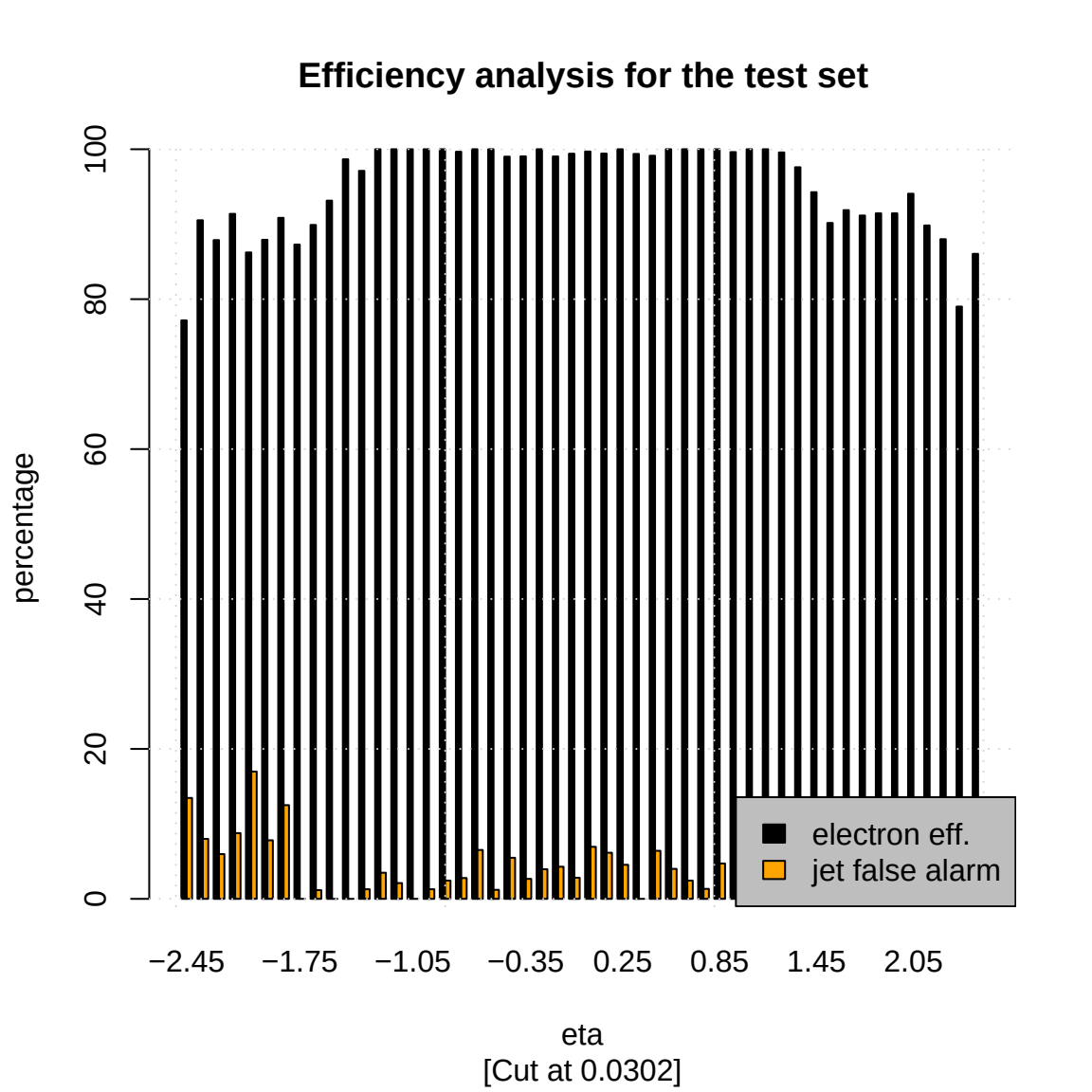

Electron counts for the train set
Counts
0
50
100
150
200
250
300
350
−2.5
−1.25
0
1.25
2.5
eta

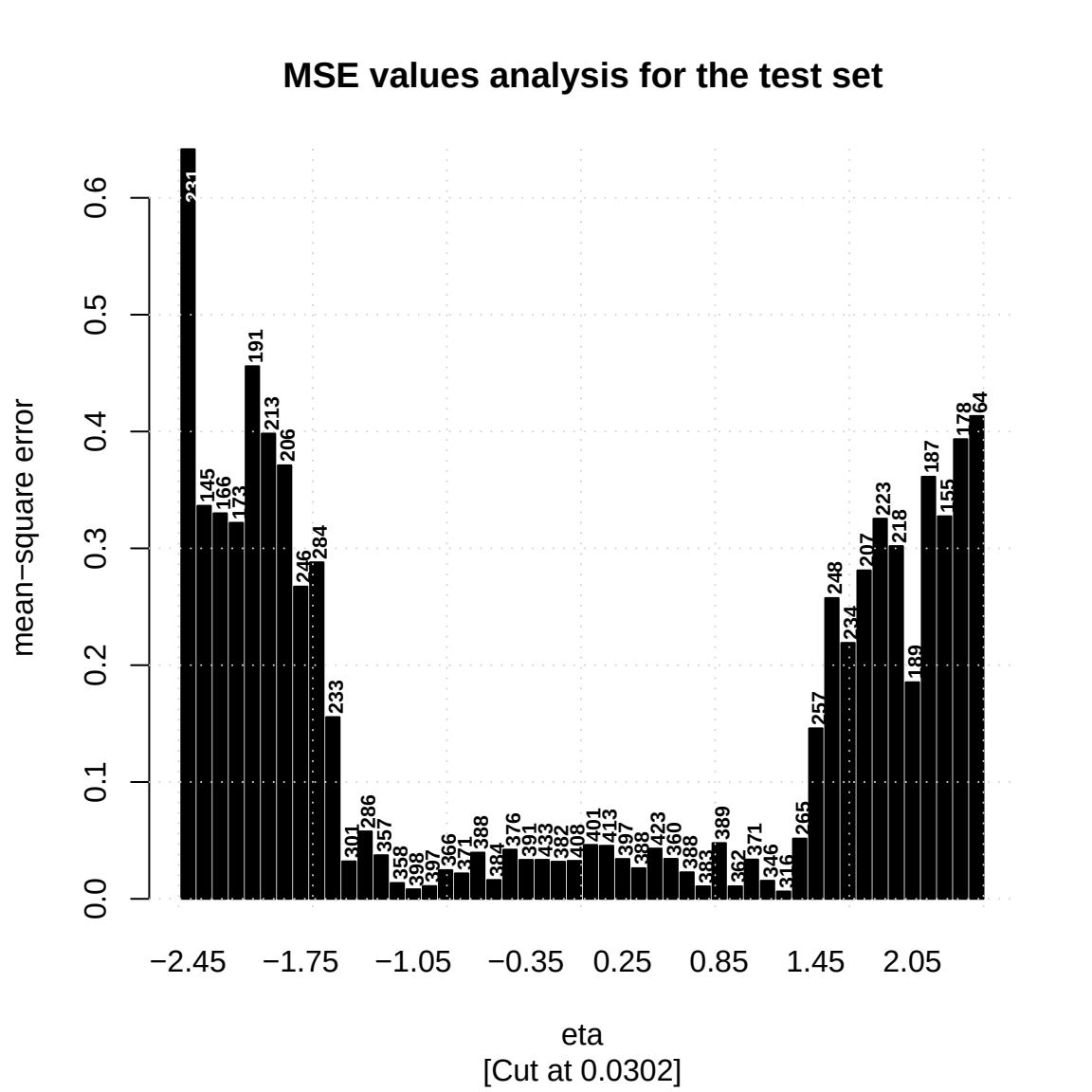

Jet counts for the train set
Counts
0
20
40
60
80
100
−2.5
−1.25
0
1.25
2.5
eta

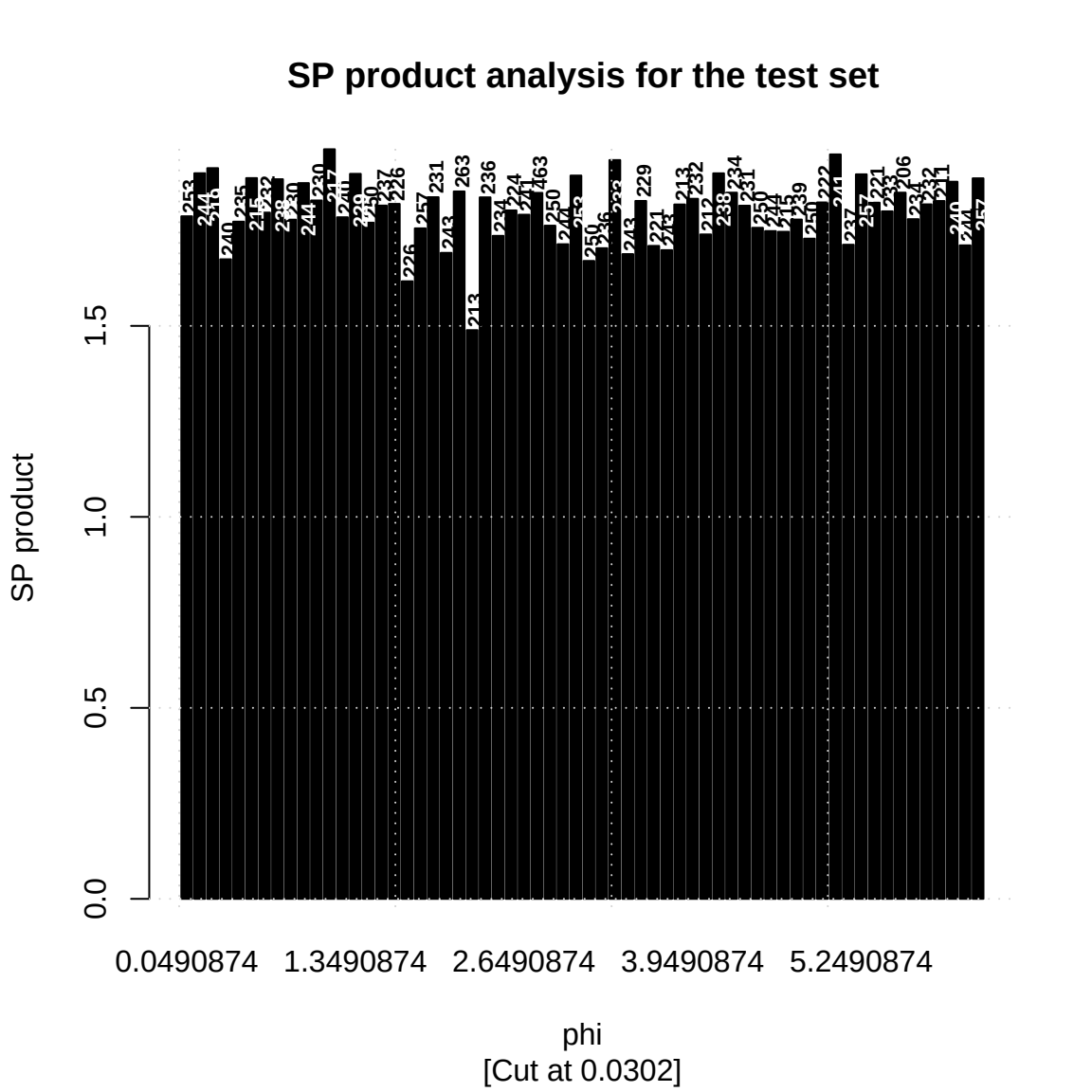

Electron counts for the train set
Counts
0
100
200
300
−0.05
1.55
3.14
4.74
6.33
phi

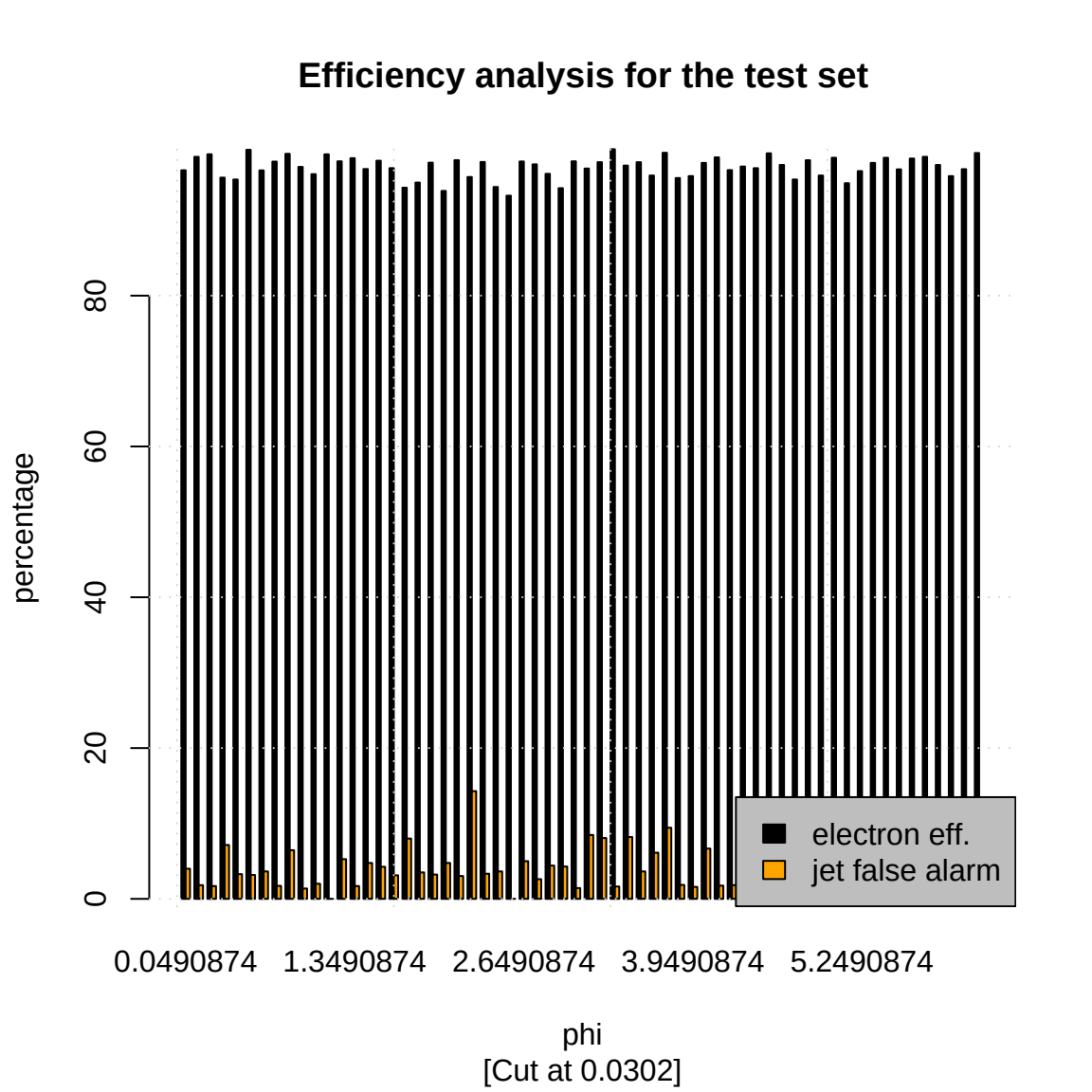

Jet counts for the train set
Counts
0
20
40
60
80
100
120
140
−0.05
1.55
3.14
4.74
6.33
phi


SP product analysis for the test set
SP product
0.0
0.5
1.0
1.5
2.0
231
145
166
173
191
213
206
246
284
233
301
286
357
358
398
397
366
374
388
384
376
391
433
382
408
401
413
397
388
423
360
388
382
389
362
371
346
316
265
257
248
234
207
223
218
189
187
155
178
64
−2.45
−1.75
−1.05
−0.35
0.25
0.85
1.45
2.05
eta
[Cut at 0.0302]

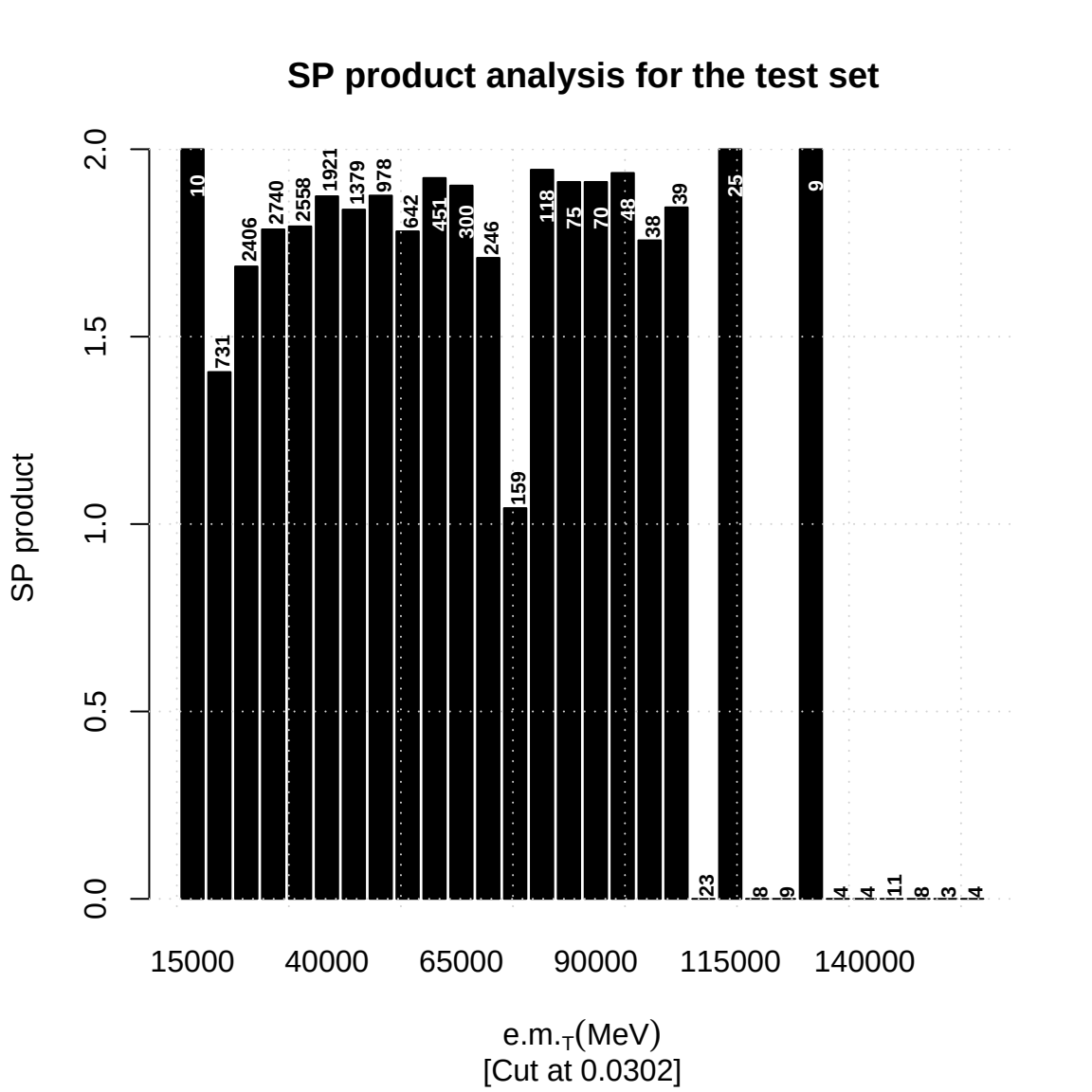

Efficiency analysis for the test set
percentage
0
20
40
60
80
100
−2.45
−1.75
−1.05
−0.35
0.25
0.85
1.45
2.05
eta
[Cut at 0.0302]
electron eff.
jet false alarm

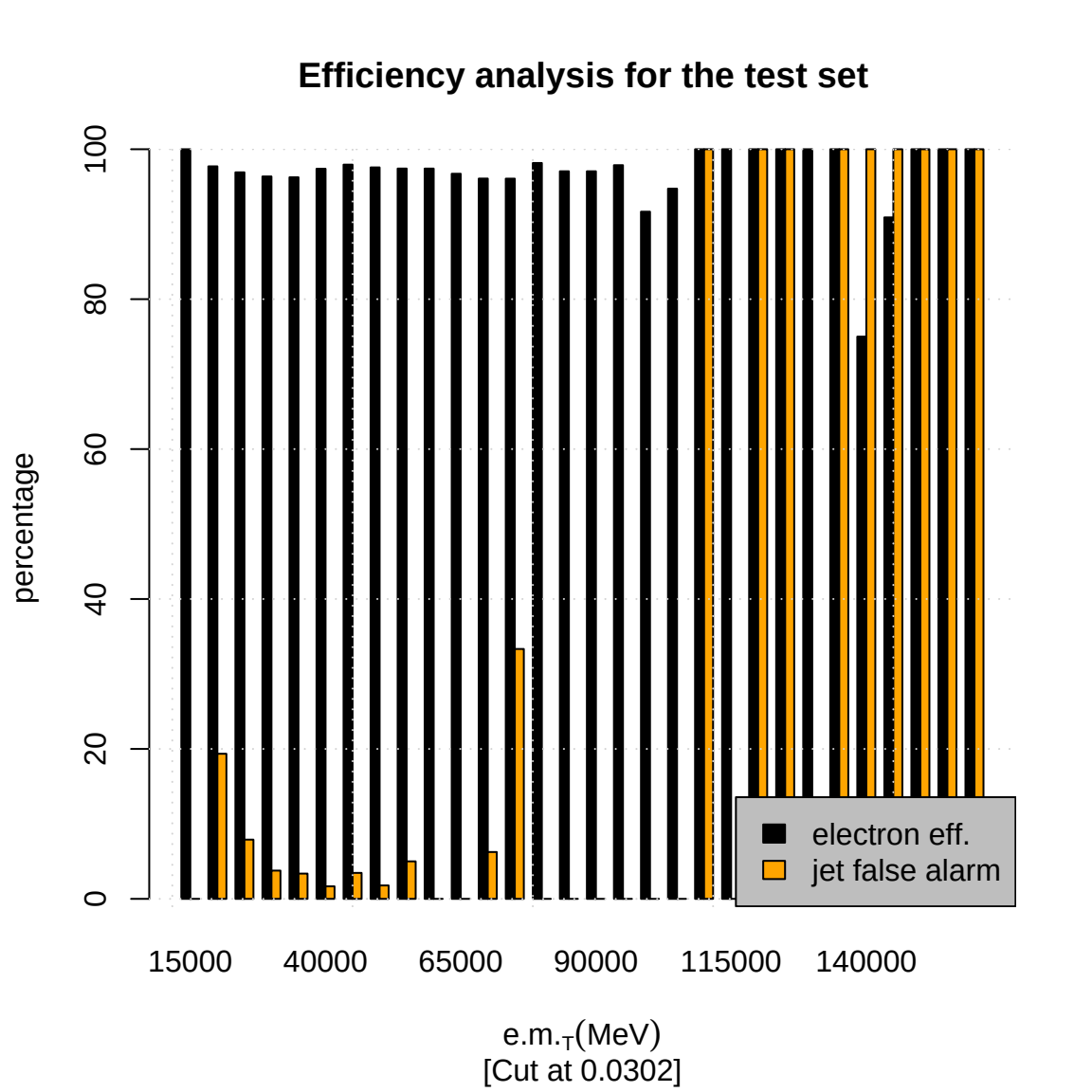

MSE values analysis for the test set
mean−square error
0.0
0.1
0.2
0.3
0.4
0.5
0.6
221
145
166
173
191
213
206
246
284
233
301
286
357
358
398
397
366
371
388
384
376
391
433
382
408
401
413
397
388
423
360
388
383
389
362
371
346
316
265
257
248
234
207
223
218
189
187
155
178
64
−2.45
−1.75
−1.05
−0.35
0.25
0.85
1.45
2.05
eta
[Cut at 0.0302]

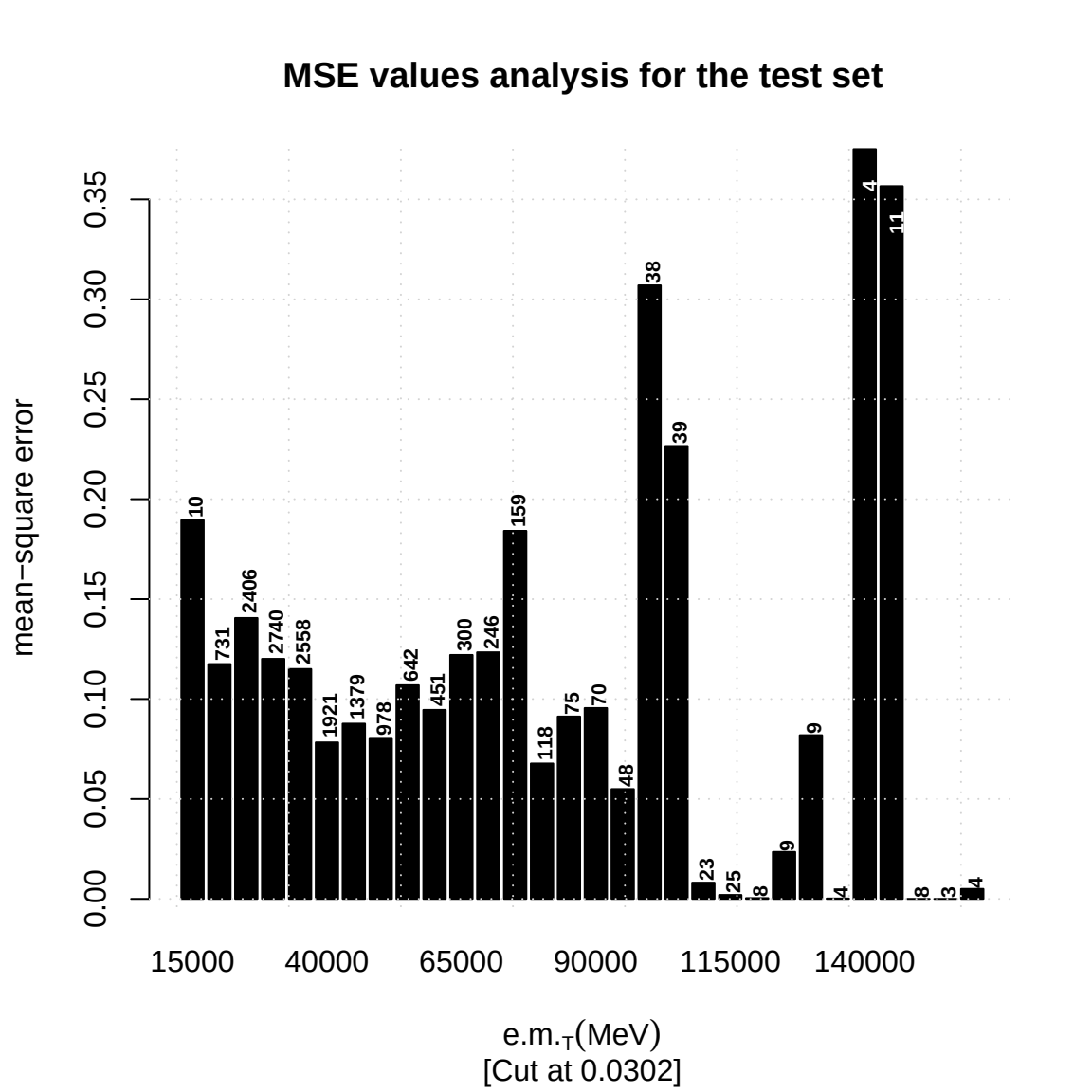

SP product analysis for the test set
SP product
0.0
0.5
1.0
1.5
0.0490874
1.3490874
2.6490874
3.9490874
5.2490874
phi
[Cut at 0.0302]

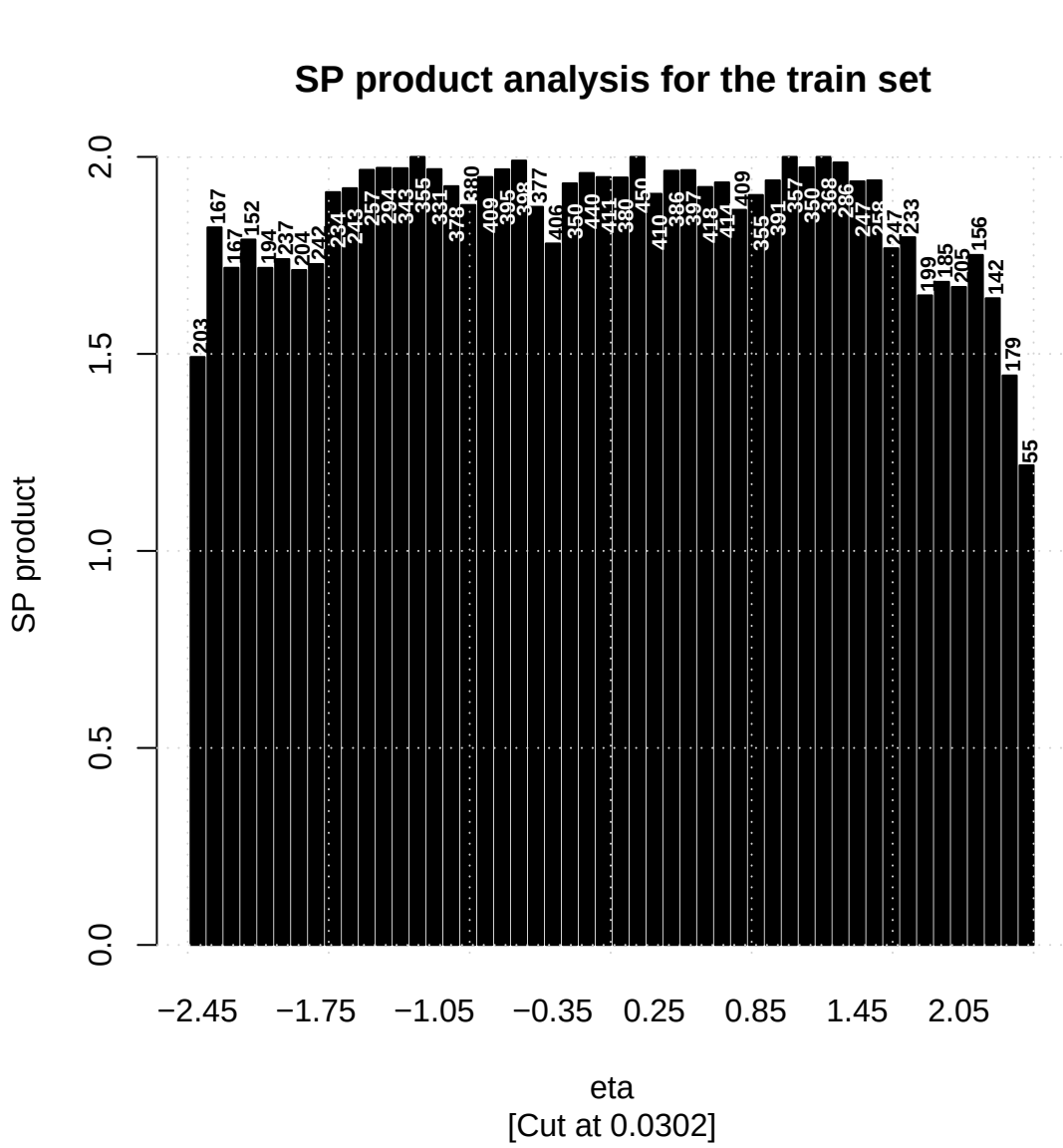

Efficiency analysis for the test set
percentage
0
20
40
60
80
0.0490874
1.3490874
2.6490874
3.9490874
5.2490874
phi
[Cut at 0.0302]
electron eff.
jet false alarm

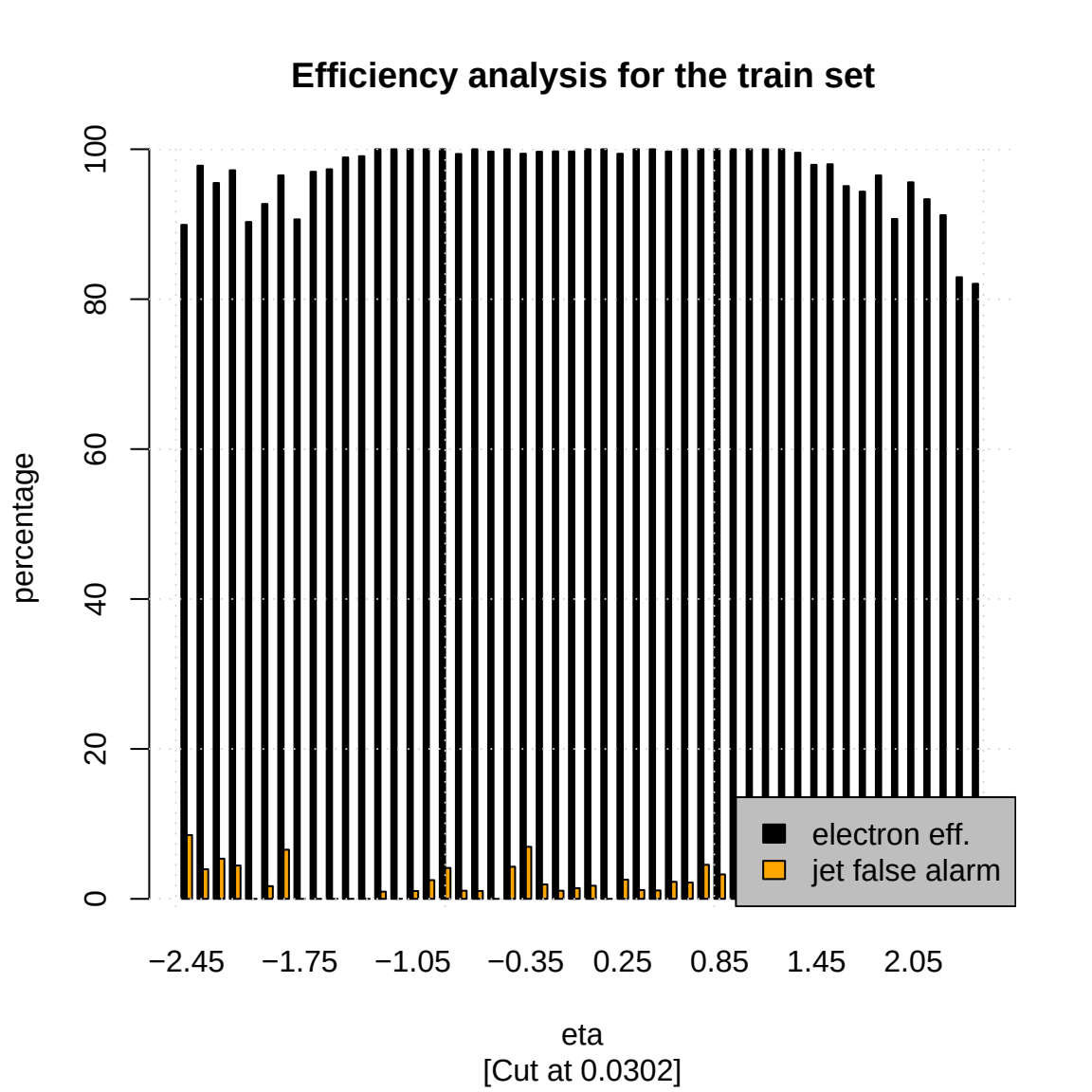
MSE values analysis for the test set
mean−square error
0.00
0.05
0.10
0.15
0.20
0.25
0.0490874
1.3490874
2.6490874
3.9490874
5.2490874
phi
[Cut at 0.0302]

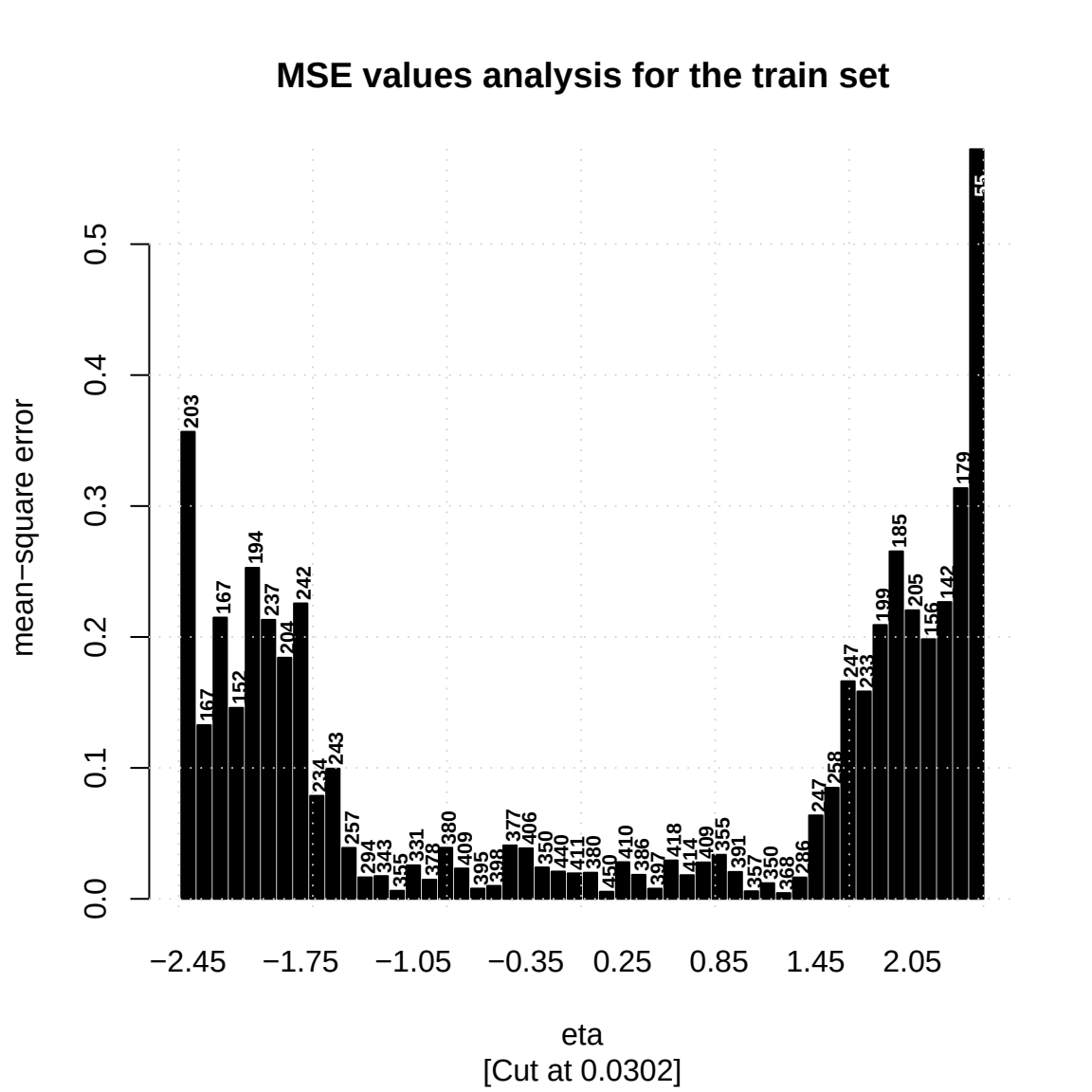

SP product analysis for the test set
SP product
0.0
0.5
1.0
1.5
2.0
10
731
2406
2740
2558
1921
1379
978
642
451
300
246
159
118
75
70
48
38
39
23
25
8
9
9
4
4
11
8
3
4
15000
40000
65000
90000
115000
140000
e.m.$_T$(MeV)
[Cut at 0.0302]

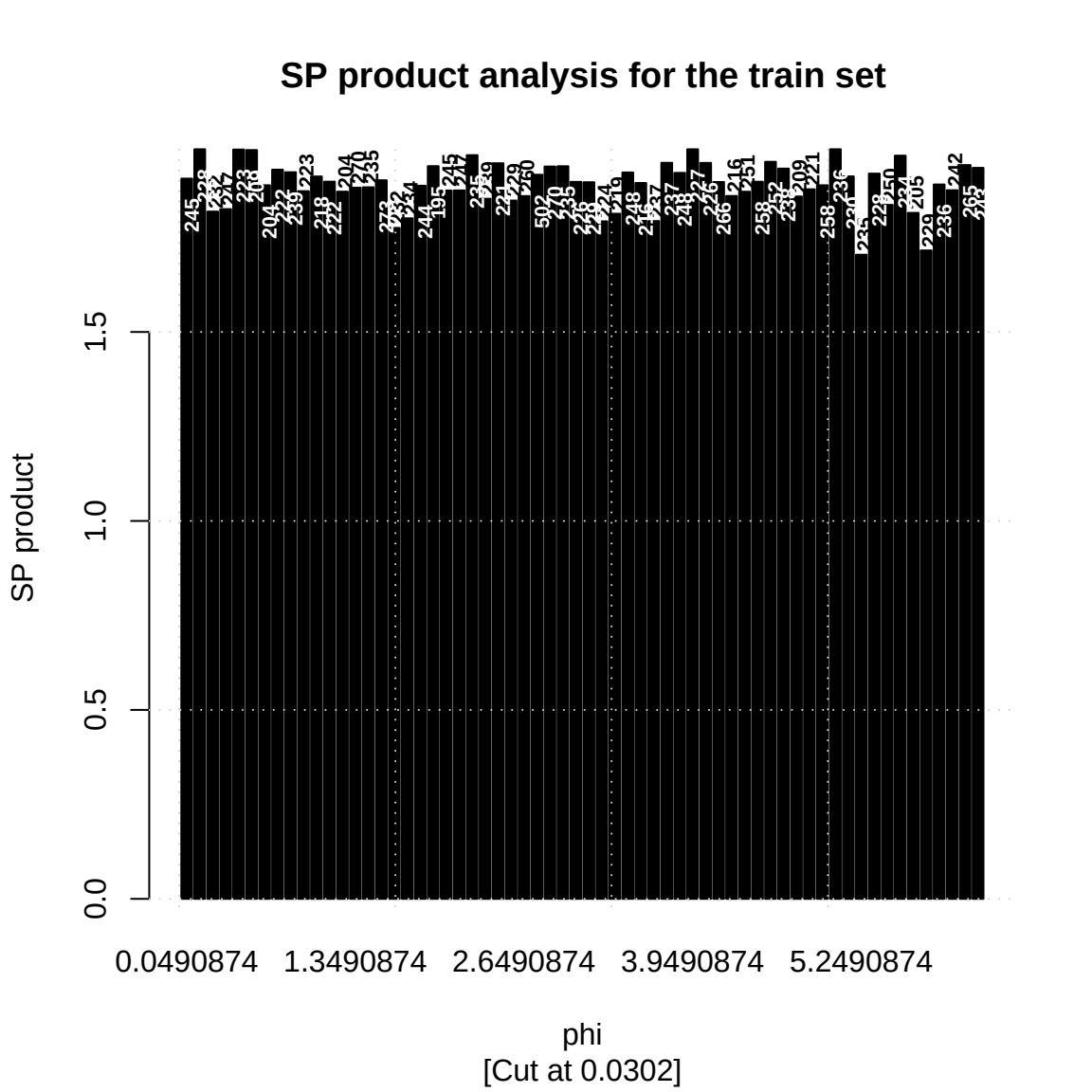

Efficiency analysis for the test set
percentage
0
20
40
60
80
100
15000
40000
65000
90000
115000
140000
electron eff.
jet false alarm
e.m.$_T$(MeV)
[Cut at 0.0302]

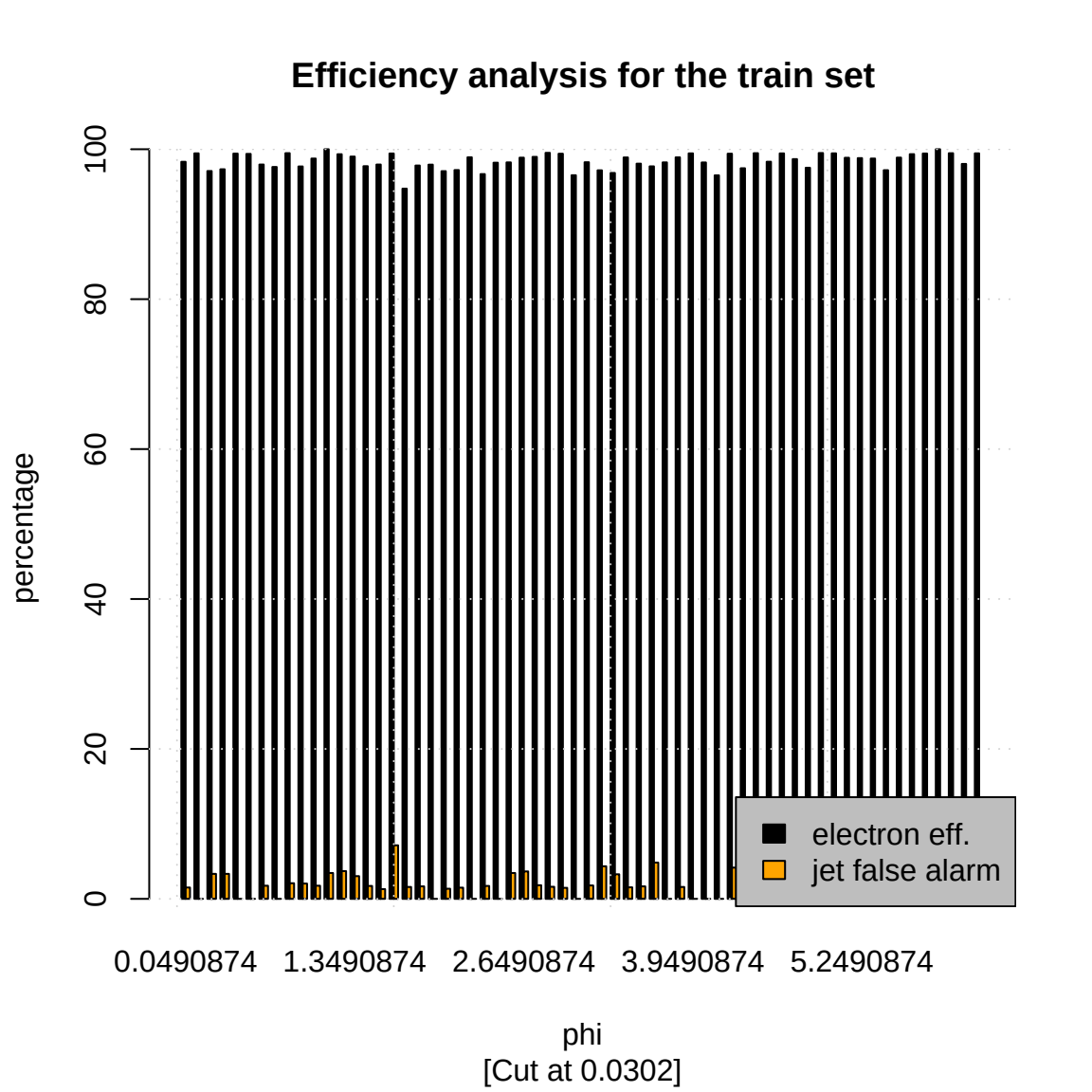

MSE values analysis for the test set
mean−square error
0.00
0.05
0.10
0.15
0.20
0.25
0.30
0.35
10
731
2406
2740
2558
1921
1379
978
642
451
300
246
159
118
75
70
48
38
39
23
25
8
9
9
4
4
11
8
3
4
15000
40000
65000
90000
115000
140000
e.m.$_T$(MeV)
[Cut at 0.0302]

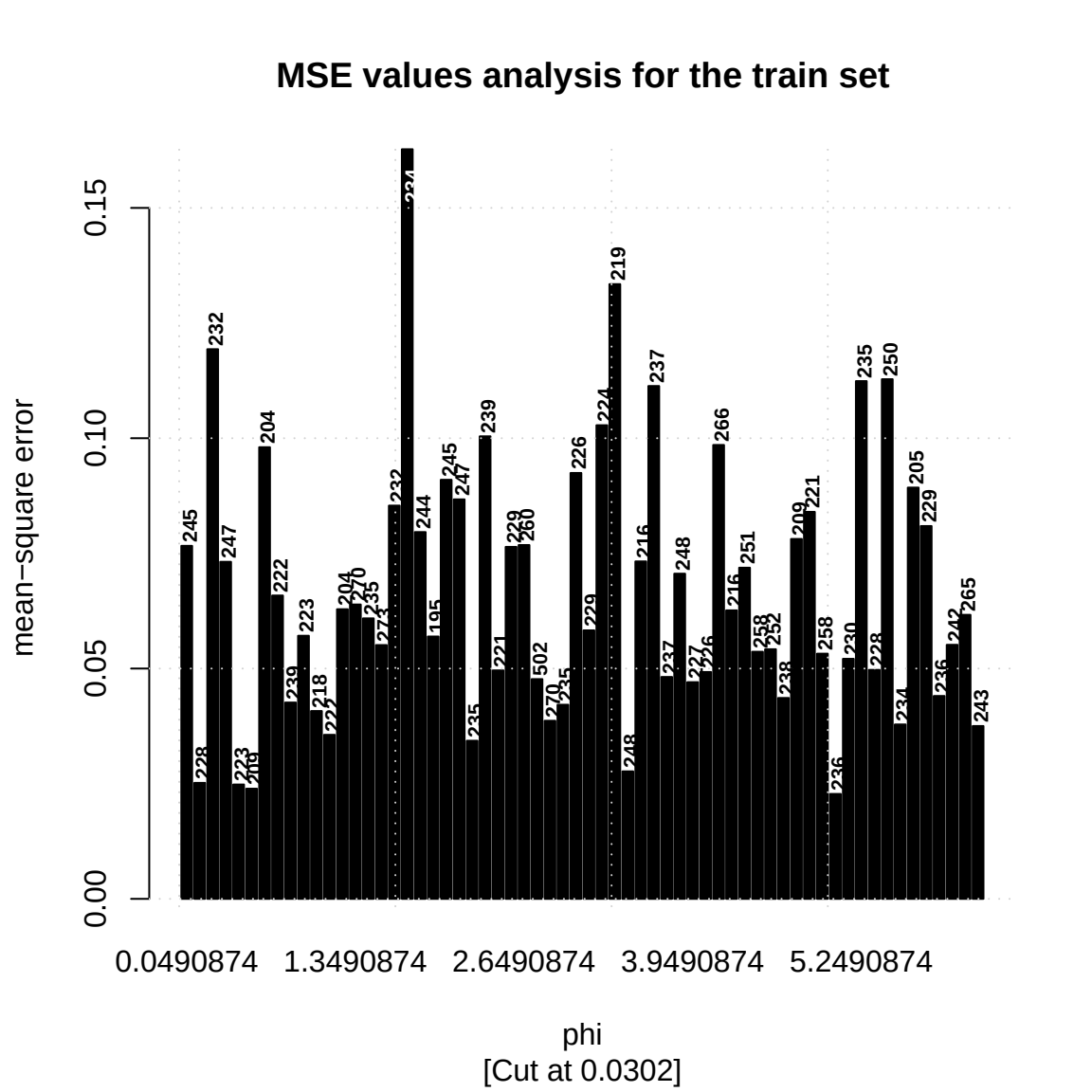

SP product analysis for the train set
SP product
0.0
0.5
1.0
1.5
2.0
203
167
167
152
194
237
204
242
234
243
257
294
343
355
331
378
380
409
395
398
377
406
350
440
411
380
450
410
386
397
418
414
409
355
391
357
350
368
286
247
218
247
233
199
185
205
156
142
179
55
−2.45
−1.75
−1.05
−0.35
0.25
0.85
1.45
2.05
eta
[Cut at 0.0302]

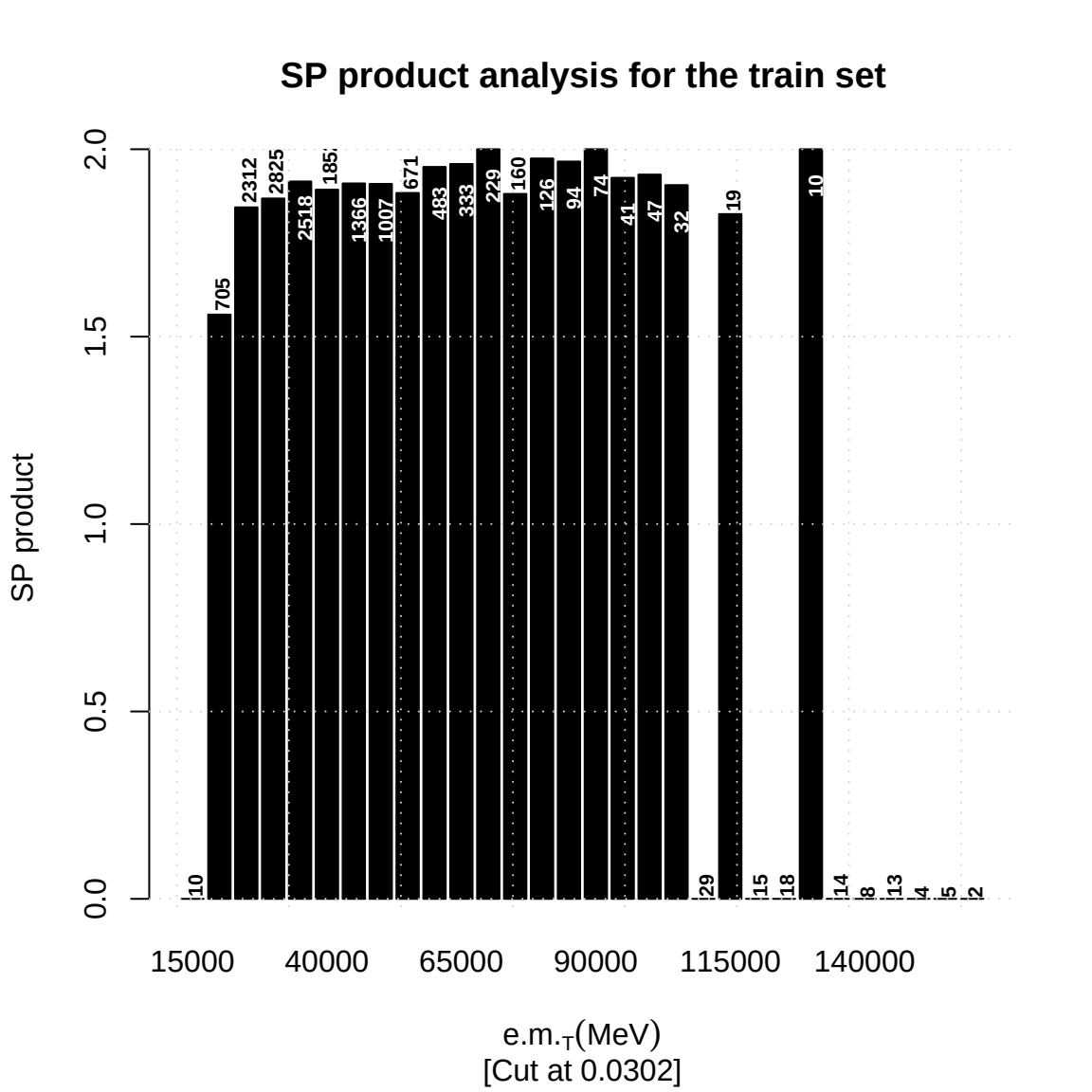

Efficiency analysis for the train set
percentage
0
20
40
60
80
100
−2.45
−1.75
−1.05
−0.35
0.25
0.85
1.45
2.05
eta
[Cut at 0.0302]
electron eff.
jet false alarm

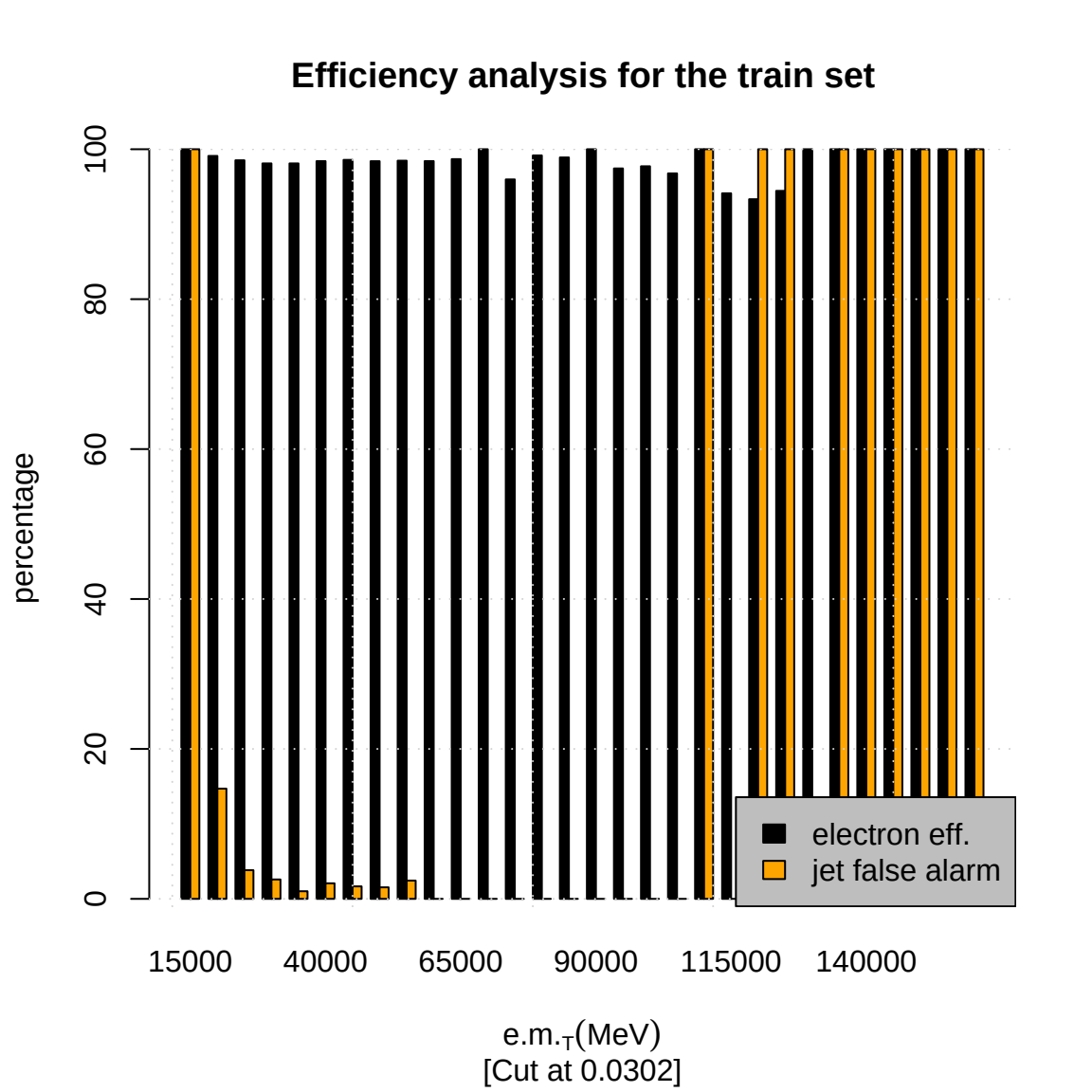

MSE values analysis for the train set
mean−square error
0.0
0.1
0.2
0.3
0.4
0.5
203
167
167
152
194
237
204
242
234
243
257
294
343
355
331
378
380
409
395
398
377
406
350
440
411
380
450
410
386
397
418
414
409
355
391
357
350
368
286
247
258
247
233
199
185
205
156
142
179
55
−2.45
−1.75
−1.05
−0.35
0.25
0.85
1.45
2.05
eta
[Cut at 0.0302]

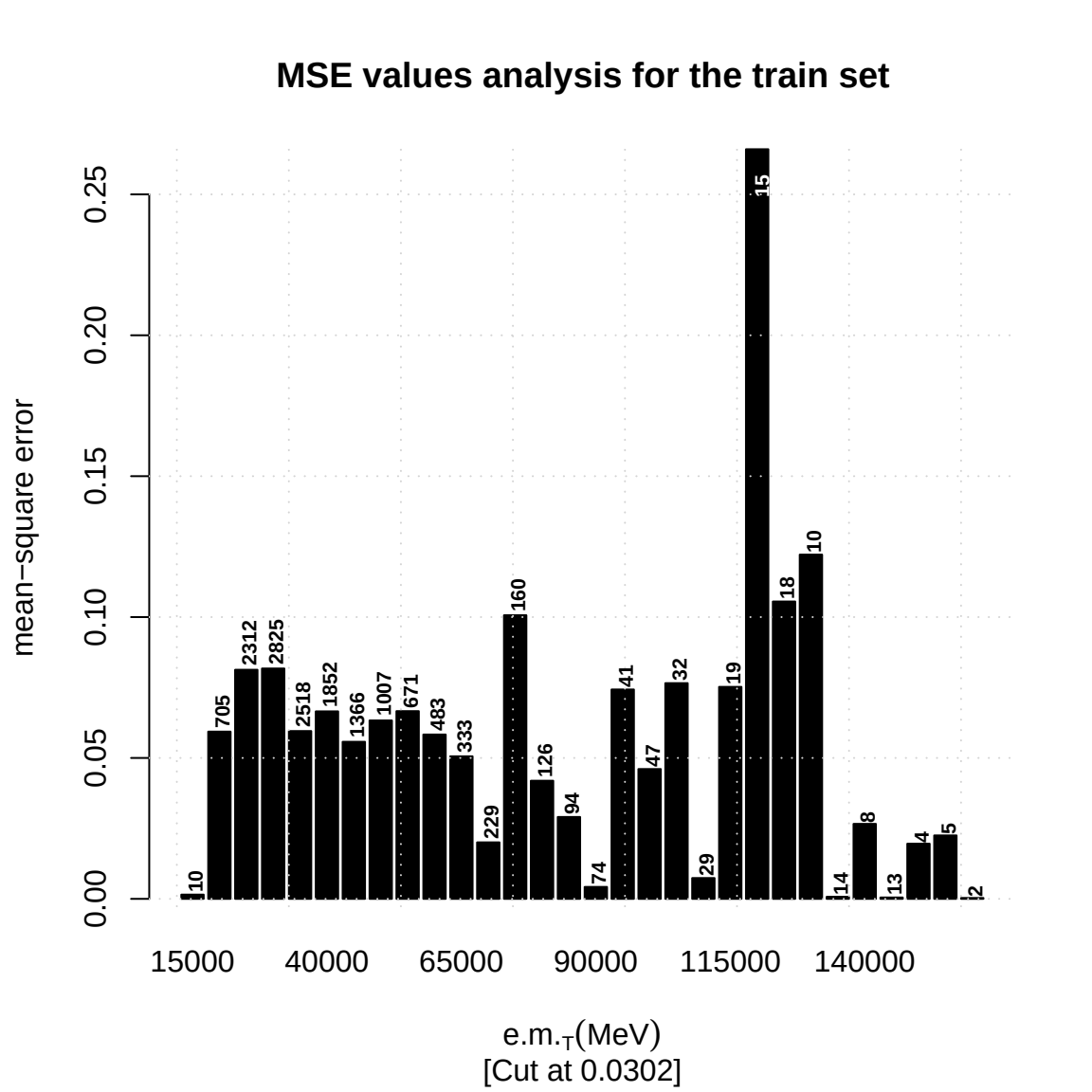

SP product analysis for the train set
SP product
0.0
0.5
1.0
1.5
0.0490874
1.3490874
2.6490874
3.9490874
5.2490874
phi
[Cut at 0.0302]

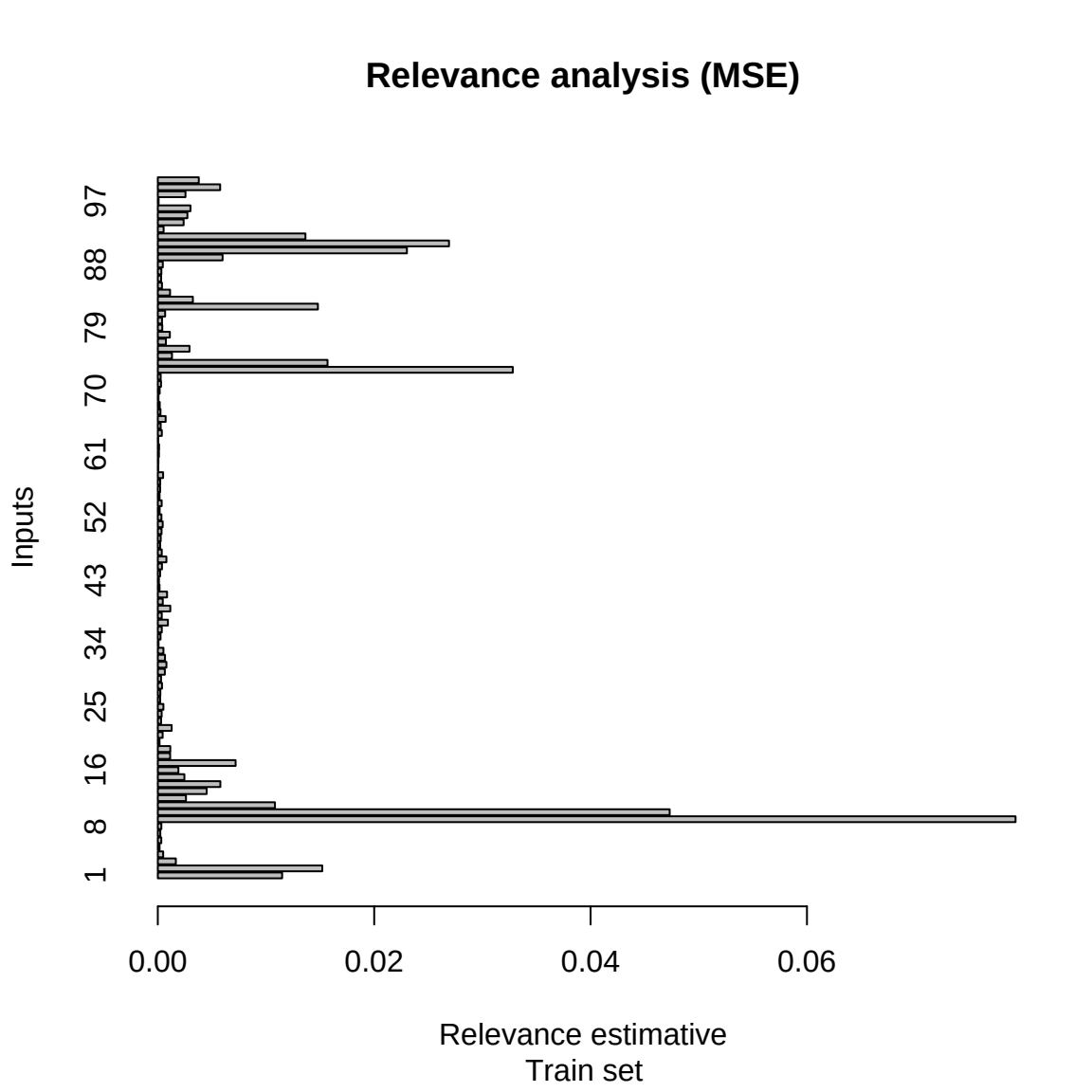

Efficiency analysis for the train set
percentage
0
20
40
60
80
100
0.0490874
1.3490874
2.6490874
3.9490874
5.2490874
phi
[Cut at 0.0302]
electron eff.
jet false alarm

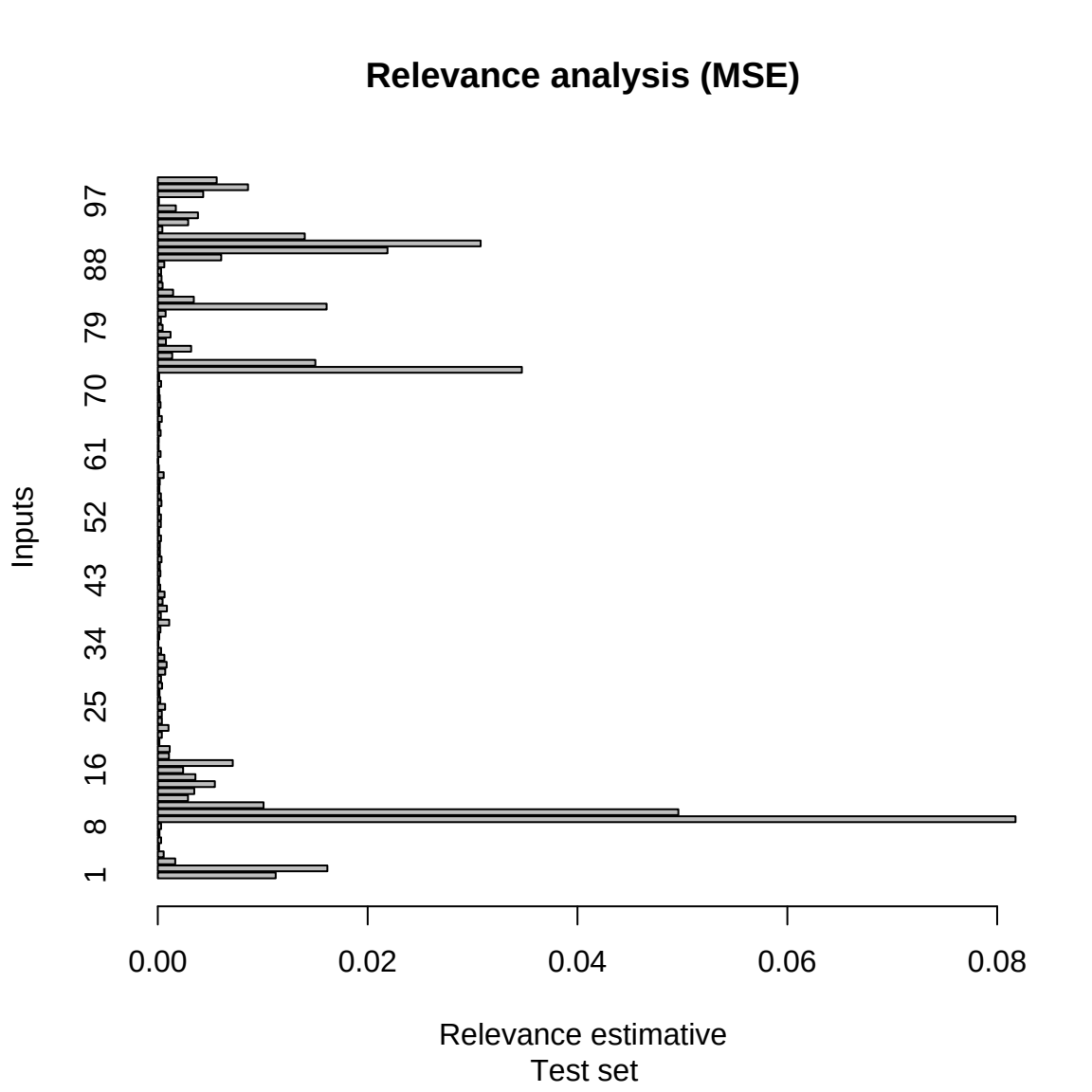

MSE values analysis for the train set
mean−square error
0.00
0.05
0.10
0.15
0.0490874
1.3490874
2.6490874
3.9490874
5.2490874
phi
[Cut at 0.0302]

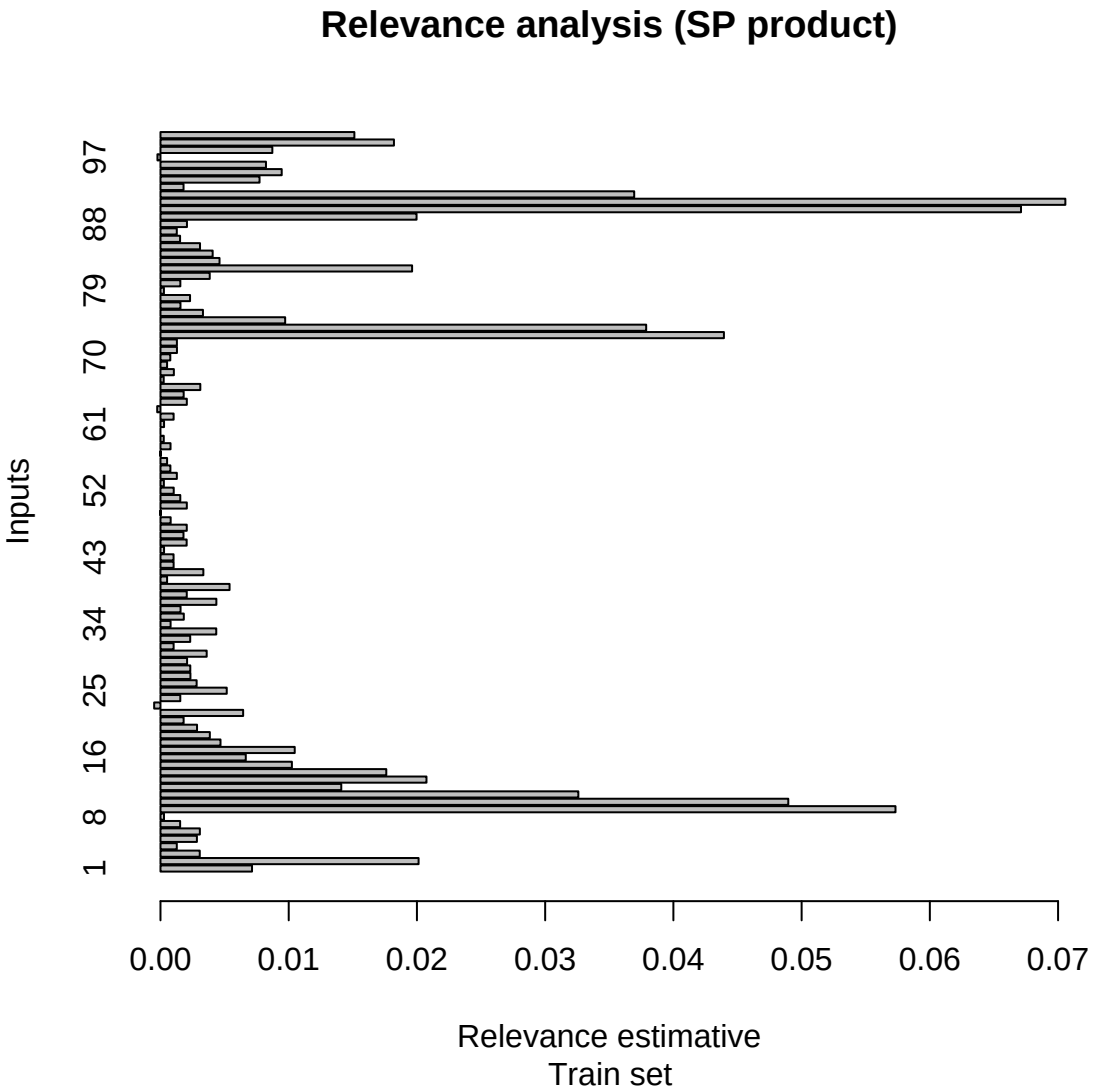

SP product analysis for the train set
SP product
0.0
0.5
1.0
1.5
2.0
10
705
2312
2825
2518
1366
1007
671
483
333
229
160
126
94
74
41
47
32
29
19
15
18
10
14
8
13
4
5
2
15000
40000
65000
90000
115000
140000
e.m.$_T$(MeV)
[Cut at 0.0302]

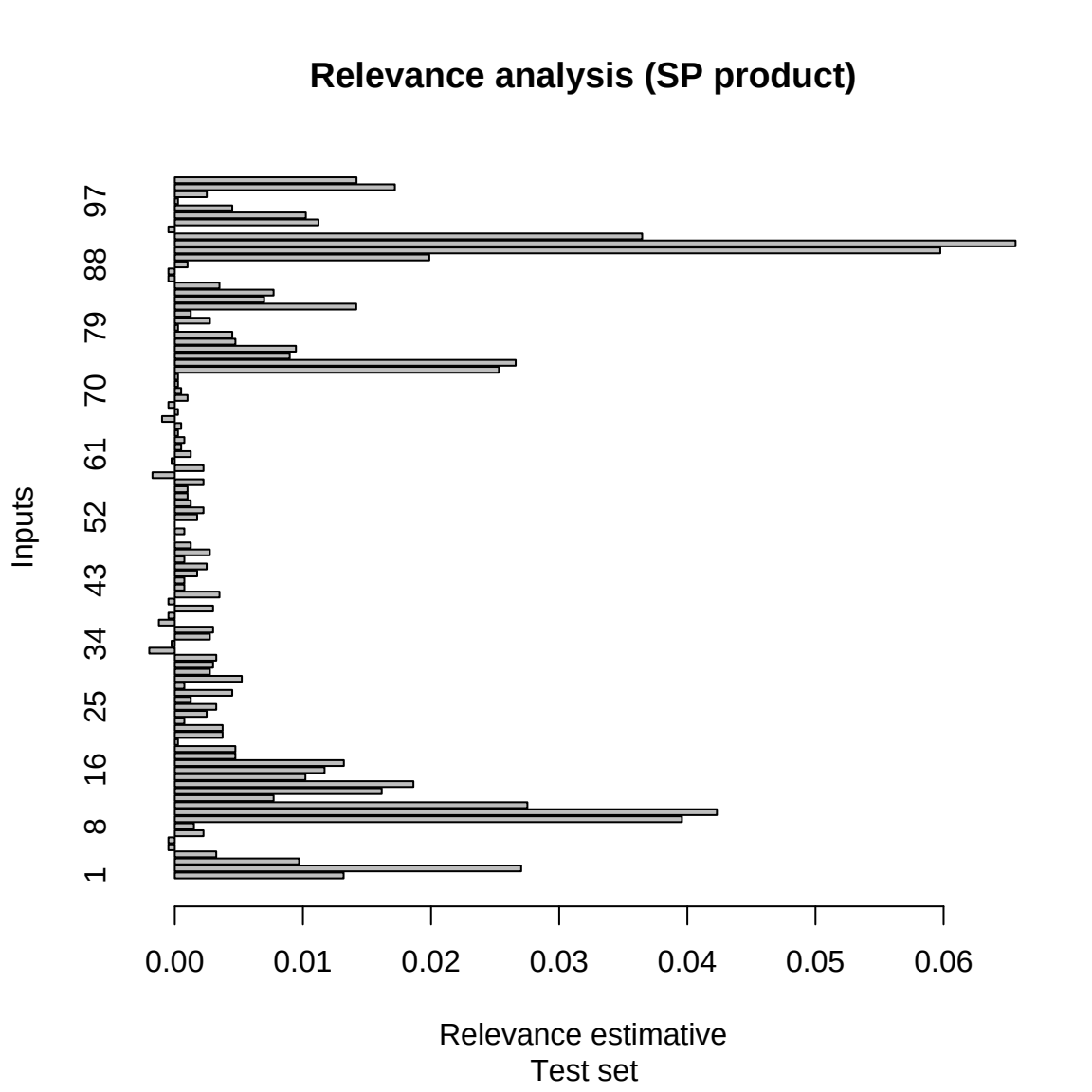

Efficiency analysis for the train set
percentage
0
20
40
60
80
100
15000
40000
65000
90000
115000
140000
electron eff.
jet false alarm
e.m.$_T$(MeV)
[Cut at 0.0302]


MSE values analysis for the train set
mean−square error
0.00
0.05
0.10
0.15
0.20
0.25
10
705
2312
2825
2518
1852
1366
1007
671
483
333
229
160
126
94
74
41
47
32
29
19
15
18
10
14
8
13
4
5
2
15000
40000
65000
90000
115000
140000
e.m.$_T$(MeV)
[Cut at 0.0302]


Relevance analysis (MSE)
Inputs
97
88
79
70
61
52
43
34
25
16
8
1
0.00
0.02
0.04
0.06
Relevance estimative
Train set


Relevance analysis (MSE)
Inputs
97
88
79
70
61
52
43
34
25
16
8
1
0.00
0.02
0.04
0.06
0.08
Relevance estimative
Test set


Relevance analysis (SP product)
Inputs
97
88
79
70
61
52
43
34
25
16
8
1
0.00
0.01
0.02
0.03
0.04
0.05
0.06
0.07
Relevance estimative
Train set


Relevance analysis (SP product)
Inputs
1
8
16
25
34
43
52
61
70
79
88
97
0.00
0.01
0.02
0.03
0.04
0.05
0.06
Relevance estimative
Test set