

**PrimEx production, Phase II**  
**September 17 - November 5, 2021**

**Beam Energy:** 10.04 GeV  
**Beam current:**  $10^{-4} X_0$   
**Converter:** 750  $\mu\text{m}$  Be

**Setup:** hd\_all.tsg\_ccal\_prod  
**Configuration:** CCAL\_FCAL\_PS\_m9 (m10)

**Begin of run:** 09/17 0:40 am

**End of run:** 11/5 6 am

**Run duration:** 49.33 days

**Accelerator efficiency:** 46 % (see table below)

**PAC equivalent, not corrected to account for smaller beam energy:** 22.7 days

**PAC equivalent, corrected according to the smaller beam energy:**  $22.7 * 0.43 = 9.8$  days

(assume energy correction coefficient of 0.43)

HV adjusted on FCAL modules

**Production on Be target (200 nA)**

Run	Date	Events (M)	Current	Target	PS (A)	Comments	Files	PS pairs (M)
<b>Phase I</b>								
81262	9/28 21:18	201						
81263		203						
81264		71						
81265		200						
81266		200						
81267	9/29 5:00	175						

**Phase II**

81374	10/3 16:15	252						
81375		251						
81376		253						
81377		23						
81378		181						
81379		187						
81380		176						
81381	10/4 5:00	177						

Total

2550

2789, Spring 2019

**Production on Be target (50 nA) CDC/FDC switched On**

81330	10/1 2:42	64						
81331		64						
81334		18						
81337		33						
81338		28						
81341		50						
81342		27						
81344		11						
81347		42						
81348		46						
81349		49						
81350		48						
81351		52						
81352		51						
81353	10/2 10:00	39						

Total

622

430 (He 50 nA) Sprin 2019

**Production on Be target (100 nA)**

81356	10/2 16:52	25						
81358		117						
81359		65						
81366		109						
81367		110						
81369		110						
81270		97						
81372	10/3 9:42	62						

Total

695

549 (He 100 nA) Spring 2019

**Empty Target Run, Be target removed, no LHe cell (200 nA)**

81384	10/4 14:10	61						
81385		55						
81386		58						
81387	10/4 20:20	62						

Total

236

**Empty Target Run, Be target removed, no LHe cell (100 nA)**

81388	10/4 22:20	31						
81389		31						
81390	10/5 2:20	12						

Total

74

**Empty Target Run, Be target removed, no LHe cell (50 nA)**

81391	10/5/ 3:10	15						
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81392		17						
81393	10/5 7:20	15						
Total		47						

**Empty Target Run, He cell installed, don't cool (200 nA)**

81396	10/5 21:10	25						
81397		53						
81398		59						
81399		77						
81400	10/6 5:55	36						
Total		250						

**Start cooling the target, cold gass in the target cell (100 nA)**

81401	10/6 7:20	22						
81402	10/6 9:10	38						
Total		60						

**Filling target cell with liquid He, some liquid in the cell (100 nA), Data Set 2**

81403	10/6 13:05	40						
81404		36						
81405	10/6 17:50	35						
Total		111						

**Production run on He target (200 nA), Data Set 1**

81411	10/6 21:00	129						
81412		136						

81413		130						
81414		129						
81415		129						
81416		98						
81419		57						
81421		130						
81422		140						
81423		116						
81424		134						
81425		126						
81426		131						
81427		60						
81428		132						
81429		119						
81430	10/8 8:00	149						

Total 2045

**Production run on He target (100 nA) Data Set 2**

81431	10/8 17:00	53						
81432		58						
81433		55						
81434		65						
81435		63						
81436		53						
81437		58						
81438		59						
81439		52						
81440		34						
81442		66						
81443		43						
81444	10/9 17:34	6						

Totak 665

Production run on He target (200 nA), Data Set 3

81445	10/9 18:00	134						
81446		135						
81447		134						
81448		63						
81449		131						
81450		10						
81451		93						
81452		42						
81453		119						
81454		120						
81455		129						
81456		131						
81457		128						
81459		127						
81460		133						
81461		128						
81462		127						
81463		120						
81464		117						
81465		49						
81466		118						
81467		119						
81468		86						
81469		3						
81470	10/11 15:30	31						

Total 2527

81471 10/11 18:30 5 ramping solenoid  
 81472 14 ramping solenoid

LED changed

**Production run on He target (200 nA), Solenoid Filed ON, Data set 4**

81473	10/11 23:11	54						
81475		35				CDC scan 2150		
81476		35				CDC scan, 2100		
81477		59				CDC scan, 2125		
81478		31				CDC scan, 2120		
81479		31				CDC scan, 2130		
81480		28				CDC scan, 2140		
81487	10/12 10:30	42						
81488		54						
81489		104						
81490		111						
81491		99						
81492		58						
81495		67						
81496		111						
81497		77						
81498		88						
81499		114						
81500		8						
81501		62						
81502		61						
81503		23						
81505		3						
81506		88						
81507		44						
81508		97						
81509		68						
81510		19						
81511		105						

81512		109						
81513		63						
81514		64						
81518		115						
81519		33						
81520		100						
81524		47						
81525		98						
81526		98						
81527		88						
81528		12						
81529		85						
81530		92						
81531	10/15 15:00	109						
Total		2616						

**Empty He target (200 nA), Solenoid Filed ON, Data set 3**

81532	10/15 17:00	0.4				emptying target		
81533		110				empty target		
81534		41						
81535		60						
81536		51						
81537		52						
81538		51						
81539		48						
81540		46						
81541		10						
81542		41						
81543		69						
81544		65						
81547		60						



81548		58						
81549		56						
81550		60						
81551		59						
81552		52						
81553		4						
81554		63						
81555		59						
81556		61						
81557		67						
81558		66						
81559		51						
81560		56						
81561		54						
81562		10						
81563		14						
Total		1494						

**Production run on He target (200 nA), Solenoid Filed ON, Data set 5**

81564		85						
81565		76						
81566		30						
81567		6				unstable beam		
81569		10				unstable beam		
81570		5				unstable beam		
81571		10				unstable beam		
81572		68				unstable beam		
81573		31						
81576		64						
81578		103						
81579		115						
81580		112						

81581		6						
81582		24						
81583		76				no beam for some		
81585		5						
81590		91						
81591		98						
81592		81						
81593		75						
81594		106						
81595	10/21 13:30	52						

Total 1329

**Production run on He target (200 nA), Solenoid Filed ON, Data set 6**

81596	10/26 18:22	30				unstable LHe		
81597		85				stable He		
81598		86						
81599		22				no FDC		
81601		92				prob with FDC		
81602		114						
81603		94						
81604		71						
81605		18						
81606		102						
81608		34						
81609		99						
81610		104						
81611		93						
81612		108						
81613		109						
81614		116						
81615		116						
81616		68						

81617		56						
81618	10/28 10:08	102						
81619		101						
81620		90						
81621		107						
81622		109						
81623		111						
81624		109						
81625		109						
81626		113						
81627		97						
81628		102						
81629		90						
81630		102						
81632		106						
81633		31						
Total		3096						

**Empty He target (200 nA), Solenoid Filed ON, Data set 4**

81634		14				Emptying target		
81635		54						
81636		54						
81637		55						
81638		58						
81639		53						
81640		39						
81641		60						
81642		62						
81643		57						
81644		56						
81645		60						
81646		58						

81647		76						
81648		53						
81649		61						
81650		53						
81651		56						
81652		61						
81655		59						
81656		58						
81657		50						
81658		51						
81659		11						
81661		4						
81662		51						
81663		50						
81664		30						
81665		11						
81666		8						
81667		36						
81668		52						
81669		60						
81670		23						
Total		1594						

**Production run on He target (200 nA), Solenoid Filed ON, Data set 7**

81674		8				Raw mode, Filling		
81675		90						
81676		110						
81677		94						
81678		75						
81679		111						
81680		99						
81681		44						

81682		107						
81683		103						
81684		112						
81685		3						
81686		100						
81687		91						
81688		94						
81689		101						
81690		61						
81691		105						
81692		105						
81693		96						
81694		108						
81695		111						
81696		62						

Total 1990

**Production run on He target (200 nA), Solenoid Filed ON, Data set 8**

81702		82						
81703		12						
81704		26						
81705		34						
81709		90						
81710		101						
81711		98						
81712		108						
81713		109						
81714		108						
81715		107						
81716		99						

Total 974

Summary 2019 / 2021

Conditions	He				Be			
	Target		Empty		Target		Empty	
	2019	2021	2019	2021	2019	2021	2019	2021
200 nA	39991	2045	3288	250	2789	2550	643	236
		2527						
100 nA	549	665		60		695		74
50 nA	430					622		47
Solenoid								
200 nA		2616		1494				
200 nA		1329		1594				
200 nA		3096						
200 nA		1990						
200 nA		974						
Total	40970	15242	3288	3398	2789	3867	643	357

PS trigger ~ 1/3 of the total (He)

PS trigger ~2/3 of the total (Empty He)

**RUN SUMMARY (2019)**

	He empty	He target		Be target	Be empty
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	885	470		2789	231
	1085	1257			412
	434	13189			
	476	5210			
	408	7146			
		9056			
		3663			
		979			
Total (M)	3288	40970		2789	643

### Accelerator Efficiency

		ABU (min)	Total (min)	Efficiency (%)
17-Sep		634	1440	
18-Sep		491	1440	
19-Sep		876	1440	
20-Sep		540	1440	
21-Sep		420	1440	
22-Sep		972	1440	
23-Sep		588	1440	
24-Sep		25	1440	
25-Sep		257	1440	
26-Sep		0	1440	
27-Sep		0	1440	
28-Sep		148	1440	
29-Sep		327	1440	
30-Sep		91	1440	
1-Oct		827	1440	
2-Oct		894	1440	
3-Oct		1004	1440	
4-Oct		923	1440	

5-Oct		593	1440	
6-Oct		1117	1440	
7-Oct		1080	1440	
8-Oct		894	1440	
9-Oct		1226	1440	
10-Oct		1108	1440	
11-Oct		900	1440	
12-Oct		785	1440	
13-Oct		958	1440	
14-Oct		628	1440	
15-Oct		655	1440	
16-Oct		888	1440	
17-Oct		1275	1440	
18-Oct		649	1440	
19-Oct		560	1440	
20-Oct		0	1440	
21-Oct		523	1440	
22-Oct		0	1440	
23-Oct		0	1440	
24-Oct		0	1440	
25-Oct		0	1440	
26-Oct		294	1440	
27-Oct		1024	1440	
28-Oct		1177	1440	
29-Oct		1141	1440	
30-Oct		1309	1440	
31-Oct		1120	1440	
1-Nov		1051	1440	
2-Nov		1163	1440	
3-Nov		342	1440	
4-Nov		640	1440	
5-Nov		421	480	

32538      71040      0.4580236