

E12-10-002 Run plan

S.P. Malace for the spokespeople of E12-10-002

Changes from the run plan outlined in the proposal:

→ **HMS**: the 45 and 55 deg settings have been replaced by a 50 deg setting (accept less statistics at the largest x at 50 deg where rates are low) => reduced running time in HMS

→ **SHMS**

→ added a 40 deg setting

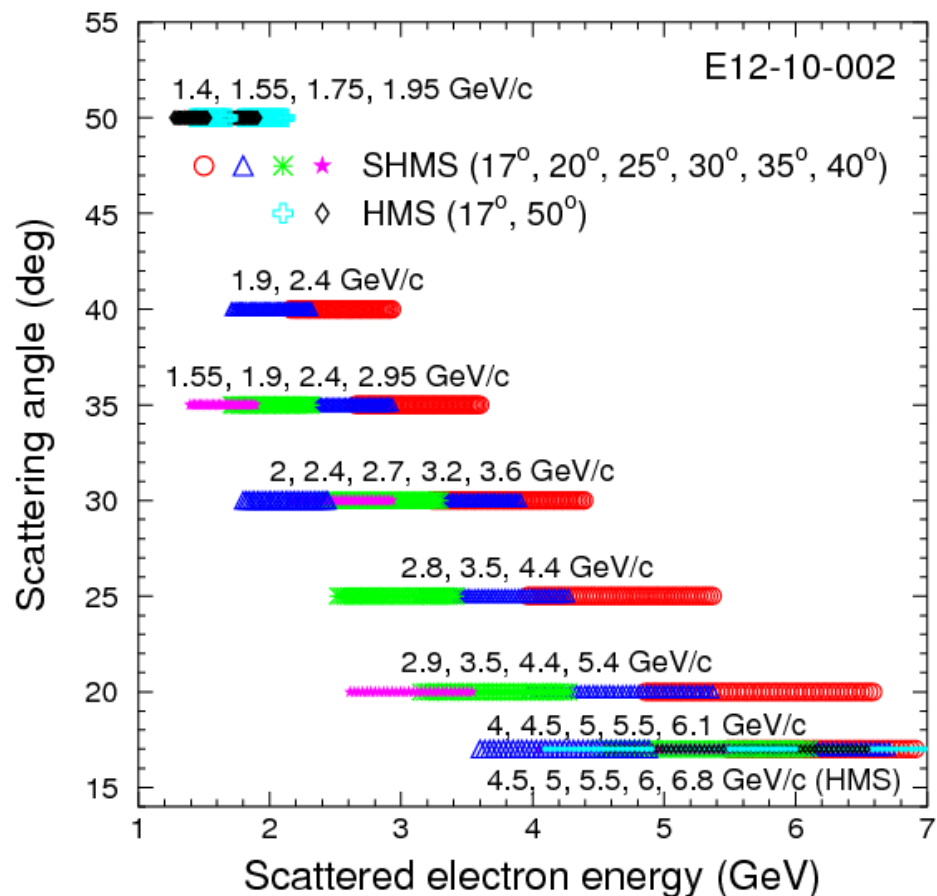
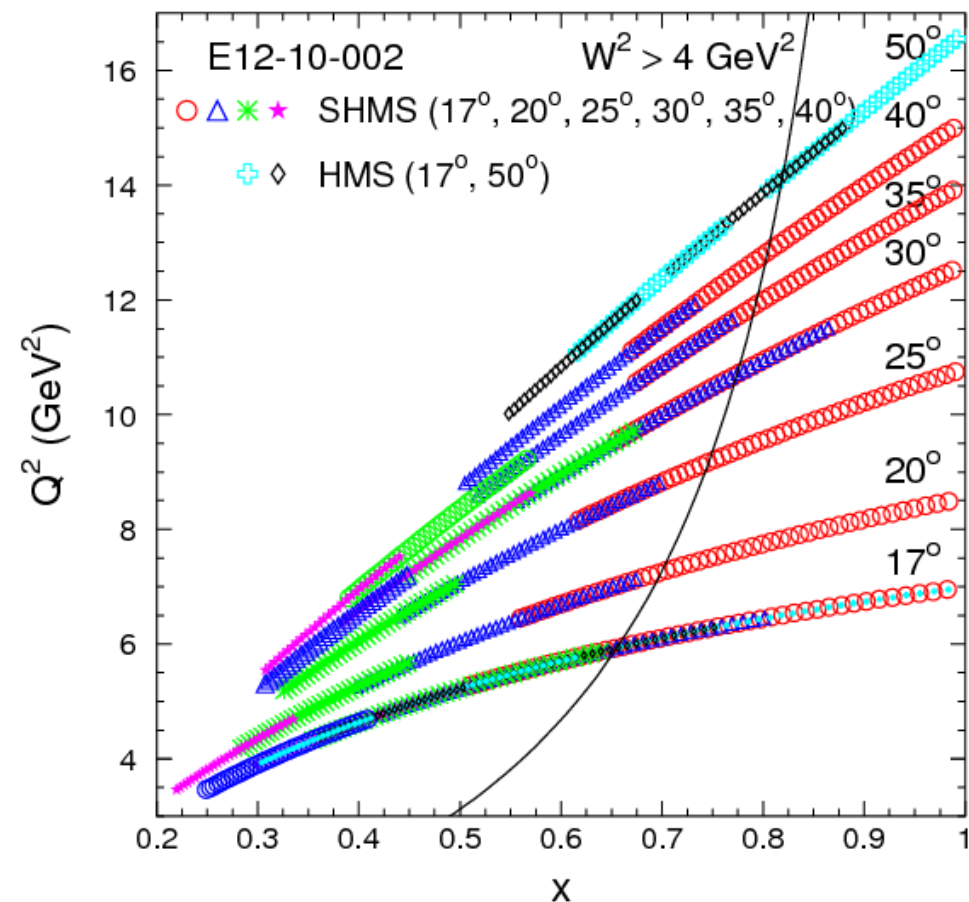
→ more overlap between momentum settings per fixed-angle setting (commissioning purposes)

→ added ^{12}C , $^{10,11}\text{B}$ running to cover part of the E12-10-008 physics program

The SHMS running time exceeds now that of the HMS

The total beam time has been reduced from 13 days (proposal) to 11 days

E12-10-002 Run plan: Kinematics



- 17 deg setting to be taken with both spectrometers: for commissioning
- good overlap between momentum settings for each fixed-angle setting: for commissioning
- substantial overlap between momentum settings at 17 deg and 30 deg: for commissioning

SHMS: stat. uncertainty = 1.5%
(δW^2 bin of 0.1 GeV²)

Angle (deg)	E_p (GeV)	Time (h) H_2
17	7.5	0.5
	6.1	0.1
	5.5	0.1
	5	0.1
	4.5	0.1
	4	0.1
20	5.4	0.4
	4.4	0.1
	3.5	0.1
	2.9	0.1
25	4.4	1.6
	3.5	0.4
	2.8	0.2
30	3.6	5.4
	3.2	2
	2.7	0.7
	2.4	0.5
	2	0.3
35	2.95	13.3
	2.4	2.5
	1.9	1
	1.55	0.6
40	2.4	22
	1.9	5

Total (SHMS e⁻, H₂): ~58 h

11 GeV beam
10 cm H₂ target
beam current = 40 μ A
 $\delta p/p$ (SHMS) = +22/-10%
 $\delta p/p$ (HMS) = +9/-9%
solid angle (SHMS) = 0.004 sr
solid angle (HMS) = 0.006 sr

HMS: stat. uncertainty = 3% at 50 deg,
1.95 GeV, 1.5% for the rest (δW^2 bin
of 0.1 GeV²)

Angle (deg)	E_p (GeV)	Time (h) H_2
17	6.8	0.1
	6	0.1
	5.5	0.1
	5	0.1
	4.5	0.1
50	1.95	28
	1.75	16
	1.55	7
	1.4	4

Total (HMS e⁻, H₂): ~55 h

SHMS (e⁻)

Angle (deg)	E _p (GeV)	H ₂ (h)	D ₂ (h)	Al(empty) (h)	¹² C (h)	¹⁰ B (h)	¹¹ B (h)
17	7.5	0.5	0.5	0.1	0.5	0.5	0.5
	6.1	0.1	0.1	0.1			
	5.5	0.1	0.1	0.1			
	5	0.1	0.1	0.1			
	4.5	0.1	0.1	0.1			
	4	0.1	0.1	0.1			
20	5.4	0.4	0.4	0.2	0.1		
	4.4	0.1	0.1	0.1	0.1		
	3.5	0.1	0.1	0.1	0.1		
	2.9	0.1	0.1	0.1	0.1		
25	4.4	1.6	1	0.5	1		
	3.5	0.4	0.4	0.2	0.25		
	2.8	0.2	0.2	0.2	0.2		
35	2.95	13.3	7	2	12	}	To be taken at the end of the e ⁻ running
	2.4	2.5	1.5	0.5	2.5		
	1.9	1	0.5	0.3	1		
	1.55	0.6	0.6	0.3	1		
40	2.4	22	11	3	11	}	
	1.9	5	3	1	2		
30	3.6	5.4	3	1	2	2	2
	3.2	2	1	0.5	0.5	0.5	0.5
	2.7	0.7	0.7	0.5	0.5	0.5	0.5
	2.4	0.5	0.5	0.2	0.5	0.5	0.5
	2	0.3	0.3	0.2	0.2	0.5	0.5
		58 h	33 h	12 h	36 h	4.5 h	4.5 h

HMS (e⁻)

Angle (deg)	E _p (GeV)	H ₂ (h)	D ₂ (h)	Al(empty) (h)
17	6.8	0.1	0.1	0.1
	6	0.1	0.1	0.1
	5.5	0.1	0.1	0.1
	5	0.1	0.1	0.1
	4.5	0.1	0.1	0.1
50	1.95	28	15	3
	1.75	16	9	2
	1.55	7	4	1
	1.4	4	2	0.5

55 h

31 h

7 h

Beam time: Summary

→ H₂, D₂ (e⁻): 91 h (91 h in SHMS & 86 h in HMS)

→ ¹²C, ^{10,11}B (e⁻): 45 h (SHMS)

→ Al (empty) (e⁻): 12 h

→ H₂, D₂, Al, ¹²C, ^{10,11}B (e⁺): 15 h (SHMS & HMS)

→ R measurement: 10 h

→ H₂ elastics: 5 h

→ target length acceptance: 12 h

→ configuration change: 45 h

→ detector checks: 24 h

Total: 259 h (~11 days)