

# SANE Status - 12/2006

- Twelve collaboration meetings (including today's)
- Submitted Beam Request on 9/14/06
  - Not possible to be on schedule for 2007, because of Hall C constraints and available beam energy
  - Need to present jeopardy Update to PAC31
    - Draft document on the Web
- Hall C schedule:
  - recent G0 extension shifts all dates by about a month
  - current: SANE tentatively to start in 5/2008 ?
- Time lines show adequate lead time for 2008 run
- Expected beam energy  $< 5.8$  GeV

# Hall C Planned Experiments to 2010

2006	E04-115	GO-Backward Angle Physics Run, E = 687 MeV
	E06-008	GO-Backward Angle Physics Run, E = 362 MeV
2007	E04-001	$R = \sigma_L/\sigma_T$ in A up to $Q^2 = 4$ (JUPITER)
	E06-009	$R = \sigma_L/\sigma_T$ in D up to $Q^2 = 4$
	E05-017 (*)	$2\gamma$ Exchange in ep Rosenbluth Separation
	E04-019 (*)	$2\gamma$ Exchange in ep Polarization Transfer
	E04-108	$G_E^p/G_M^p$ up to $Q^2 = 9$ (GEp-III)
2008	E03-109	Spin Asymmetries on the Nucleon Exp. (SANE)
	E04-113 (*)	Semi-Inclusive Spin Asymmetries (semi-SANE)
	E05-101 (*)	Helicity Correlations in Wide-Angle Compton
	E05-115	Hypernuclear Spectroscopy (HKS/HES)
2009	E05-008	Qweak Experiment - Installation and Phase I
2010	E05-008	Qweak Experiment - Phase II
2010+?	E04-110 (*)	$G_E^n$ at $Q^2 = 4.3$ (8.0) from the ${}^2\text{H}(e,e'n)$ Reaction

(\*) not clear yet whether schedule constraints will preclude some of these..., need to see next iteration of long-term schedule.

# Draft Schedule 2007-2008

→ 02/18/07      E06-008      GO-Backward Angle Physics Run, E = 362 MeV

*Hall Reconfiguration*

03/24/07	E04-001	R = $\sigma_L/\sigma_T$ in A up to $Q^2 = 4$ (JUPITER)	}
	E06-009	R = $\sigma_L/\sigma_T$ in D up to $Q^2 = 4$	
→ 05/24/07	E05-017 (*)	2 $\gamma$ Exchange in ep Rosenbluth Separation	

*Hall Reconfiguration*

07/23/07	E04-019 (*)	2 $\gamma$ Exchange in ep Polarization Transfer
→ 02/19/08	E04-108	$G_E^p/G_M^p$ up to $Q^2 = 9$ (GEp-III)

*Hall Reconfiguration*

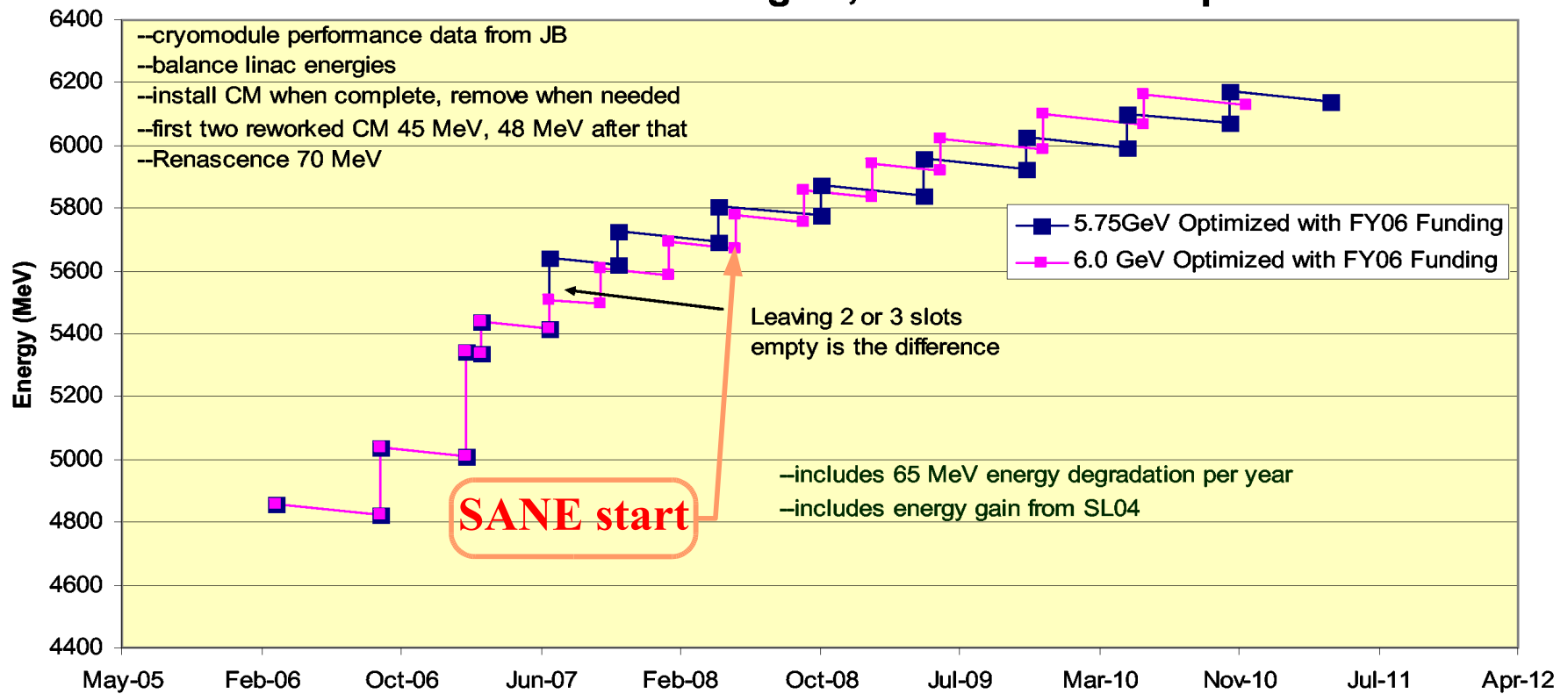
**5.7 GeV  
start 10/07**

04/01/08	E03-109	Spin Asymmetries on the Nucleon Exp. (SANE)
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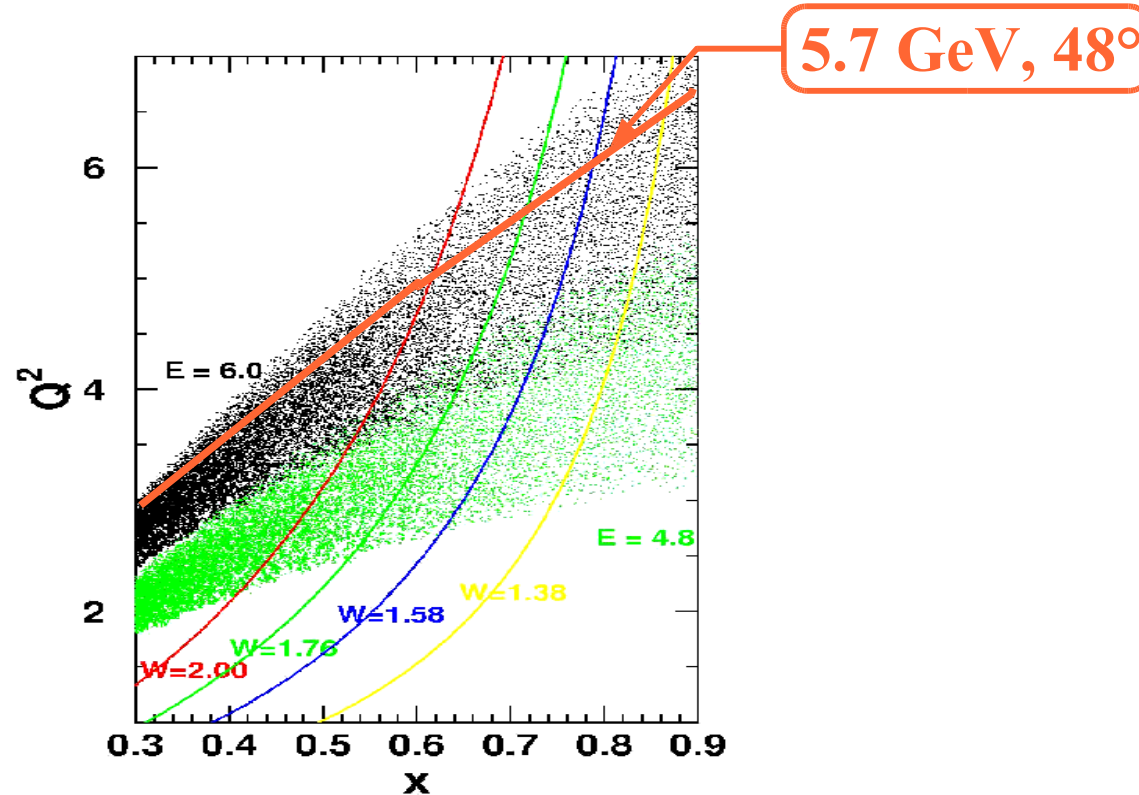
- 1) This assumes funding at restored FY05 levels (i.e., no Summer down).
- 2) Complicated (Jigsaw) schedule due to constraints for L/T's, also in Hall A (CSR).
- 3) Tentatively, E05-017 and E04-019 lucked out and on draft schedule.

# CEBAF energy

**CEBAF Energy Projection 2006-2009**  
**Balanced Linac Energies, 5.75 or 6.0 GeV Optimized**



# SANE Kinematics



- Two beam energies: 6 GeV (now ~ 5.7 GeV), 4.8 GeV (now ~ 4.6 GeV)
- More on this in James Maxwell's report

# SANE Physics

- Measure **proton** spin structure function  $g_2(x, Q^2)$  and spin asymmetry  $A_1(x, Q^2)$  at four-momentum transfer  $2.5 \leq Q^2 \leq 6.5 \text{ GeV}^2$  and Bjorken  $x$   $0.3 \leq x \leq 0.8$

**REPORT TO THE  
NUCLEAR SCIENCE ADVISORY  
COMMITTEE**

**Submitted by the  
SUBCOMMITTEE ON PERFORMANCE  
MEASURES**

**November 18, 2003**

2011	<u>Measure the lowest moments of the unpolarized nucleon structure functions (both longitudinal and transverse) to <math>4 \text{ GeV}^2</math> for the proton, and the neutron, and the deep inelastic scattering polarized structure functions <math>g_1(x, Q^2)</math> and <math>g_2(x, Q^2)</math> for <math>x=0.2-0.6</math>, and <math>1 &lt; Q^2 &lt; 5 \text{ GeV}^2</math> for both protons and neutrons.</u>
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- Meets or Exceeds DOE 2011 Milestone for Proton Spin Structure, IF
  - **SANE takes data no later than 2008**

# Beam Time Request

	Energy	$\theta_N$	Time (h)	
<b>Production</b>	6.0	180	100	
	6.0	80	200	
	4.8	180	70	
	4.8	80	130	
	2.4	-	10	
<b>Systematics</b>	Packing Fraction		20	
	Mollers		21	
	Total beam time		551	(23 d)
<b>Overhead</b>	Anneals		62	
	Energy Change		48	
	Target Rotation		48	
	Stick Changes		48	
	Total Overhead		206	(9 d)
Requested Time		654	(27 d)	

	Energy	$\theta_N$	Time (h)	
<b>Production</b>	2.3	off, 0, 180	40	
	4.6	180	70	
	4.6	80	130	rotate
	5.7	80	200	
	5.7	180	100	rotate
<b>Systematics</b>	Packing Fraction		20	
	Mollers		21	
	Total beam time		581	(24 d)
<b>Overhead</b>	Anneals		62	
	Energy Change		48	
	Target Rotation		48	
	Stick Changes		48	
	Total Overhead		206	(9 d)
Requested Time		654	(27 d)	

# Preliminary Run Plan - 9/14/06

Start: 04/01/08  
Finish: 05/25/08

## SANE Run

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	Activity Name	Duration	Start	Finish	March 2008				April 2008				May 2008				June 2008				
					02	03/09	03/16	03/23	03/30	04/06	04/13	04/20	04/27	05/04	05/11	05/18	05/25	06/01			
1	SANE Run	54	04/01/08	05/24/08				04/01/08													
2	Commission/Calibration	5	04/01/08	04/05/08		Commission/Calibration															
3	Energy change 2 pass => 4 pass	1	04/06/08	04/06/08		Energy change 2 pass => 4 pass															
4	4.6 GeV parallel	4	04/07/08	04/10/08		4.6 GeV parallel															
5	Target rotation 180° - 80°	1	04/11/08	04/11/08		Target rotation 180° - 80°															
6	Chicane alignment	0	04/11/08	04/11/08		04/11/08															
7	4.6 GeV 80 deg.	10	04/12/08	04/21/08		4.6 GeV 80 deg.															
8	Energy change 4 pass => 5 pass	1	04/22/08	04/22/08		Energy change 4 pass => 5 pass															
9	Chicane alignment (if needed)	0	04/22/08	04/22/08		04/22/08															
10	5.7 GeV 80 deg.	21	04/23/08	05/13/08		5.7 GeV 80 deg.															
11	Target rotation 80° - 180°	1	05/14/08	05/14/08		Target rotation 80° - 180°															
12	Chicane alignment	0	05/14/08	05/14/08		05/14/08															
13	5.7 GeV parallel	10	05/15/08	05/24/08		5.7 GeV parallel															



# Updated Run Plan

Start: 04/29/08  
Finish: 06/22/08

## SANE Run Gantt View: Gantt Table

?	Activity Name	Duration	Start	April 08					May 08					June 08				July		
				30	6	13	20	27	4	11	18	25	1	8	15	22	29			
1	SANE Run	54	04/29/08																	
2	Commission/Calibration	5	04/29/08																	
3	Energy change 2 pass => 4 pass	1	05/04/08																	
4	4.6 GeV parallel	4	05/05/08																	
5	Target rotation 180° - 80°	1	05/09/08																	
6	Chicane alignment	0	05/08/08																	
7	4.6 GeV 80 deg.	10	05/10/08																	
8	Energy change 4 pass => 5 pass	1	05/20/08																	
9	Chicane alignment (if needed)	0	05/19/08																	
10	5.7 GeV 80 deg.	21	05/21/08																	
11	Target rotation 80° - 180°	1	06/11/08																	
12	Chicane alignment	0	06/10/08																	
13	5.7 GeV parallel	10	06/12/08																	

# SANE Current Design (8/06)

## BETA

