LBNE LAr Parameters Spreadsheet

Version 10.5 - 10/18/2011

Changes highlighted in RED

unhide columns to see 34 kton option

33 kton

Input value	
Calculated	
Reference Design, 800'	

Quality	Meaning
***	Stable, well understood parameter
**	Reasonably well defined parameter
*	Rough estimate

Parameter	Value	Units	Quality	Notes
Anode Plane Assembly (APA)				
Cathode Plane Assembly (CPA)				
Detector Module				
Cryostat module				
Electronics				
High Voltage				
Cryogenics				
Detector Depth				
Minimum vertical rock cover	656	ft	***	Similar depth as that used in Bueno study for GLACIER concept
	200	m		
Minimum rock cover at any angle	518	ft	***	Similar depth as that used in Bueno study for GLACIER concept
	158	m		
Longitudinal axis of the LAr cavern	N80W +/-10	degrees	***	Beam direction from Fermilab
Rock formation	Ellison and Northwestern Formations		*	Golder design report# 11381779
Rock density	2.82	g/cm^3	***	doc #916. Have been told that 2.9 g/cm^3 is the "correct value"
Cosmic ray fluence	2.67E-06	Hz/cm^2-sr	***	Measured CR rate - doc #2625
Cosmic ray rate	0.063	Hz/m^2	**	Craig Thorn calc. - doc #3018
Cosmic ray rate - detector top	64	Hz		
Cosmic ray rate - APA top	1.2	Hz		
Radioactive Background				
Estimated Ar39 decay rate	1	Hz/kg	**	NIM A574 , 83 (2007)
Average Ar39 decay energy	200	keV	**	NIM A574 , 83 (2007)
APA cell Ar39 decay rate	182	kHz		
Average Kr85 decay energy	251	keV	**	doc #3018
APA cell Kr85 decay rate	28	kHz	**	doc #3018
Veto System				
Veto Configuration				
Veto square tube size outer	10.2	cm	**	4" square tubing
Veto square tube size inner	8.9	cm		1/4" wall thickness
Num veto rows	2		*	
Num veto levels	2		*	One at top, one near bottom
Num side veto tubes per layer	2190			both sides of cavern, extending 5m past the detector on both ends, 2 rows
Num end veto tubes per layer	1147			both ends of cavern extending 9m past the detector on both ends
Total num veto tubes per layer	3337			
Total num veto tubes per cryostat	6674			
Total num veto tubes for TWO cryostats end to end	12200			
Veto Counter				
Veto counter tube size outer	8.4	cm		0.5 cm allowance
Veto counter tube size inner	7.8	cm		3 mm wall thickness
Veto counter length	9	m	**	7m in the rock and 2m over the top of the detector
Veto counter volume	54,616	cm^3		volume of liquid scintillator in each counter
Veto counter extrusion volume	8737	cm^3		
Total liquid scintillator volume	364	m^3		
Total veto counter extrusion volume	58	m^3		
Total veto counter extrusion weight	78	kg		
Photon Detector				
DAQ				
Cavern & Pit				