Monte Carlo Trigger Rates Summary
(VG MC Trigger Rate Summary.doc)

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Latest Update: Jan 25, 2005
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Configuration – Van de Graaff On	MC Ω x effic [sterad]	Relative to BGO	γ Rate [Hz]
BGO (14.6 + 17.6 Mev lines)			
BGO front face 6.0" from center of target.	.148 ± .001	1.000	15. (LiF target)
3-in-a-row Tracker Trigger			
EM1 top tray face 2.0" from center of target	.308 ± .003	2.08 (2.2 seen)	
EM2 top tray face 1.0" from center of target	.495 ± .004	3.34	
EM2 top tray face 2.0" from center of target	.398 ± .004	2.69	
EM2 top tray face 4.0" from center of target	.271 ± .003	1.83	
Tower top tray face 1.0" from center of target	1.099 ± .011	7.42	
Tower top tray face 2.0" from center of target	0.909 ± .015	6.14	
Tower top tray face 4.0" from center of target	0.657 ± .012	4.44	
LAT16 top tray face 1.0" from center of target	3.11 ± .03	21.0	
LAT16 top tray face 2.0" from center of target	2.95 ± .03	20.0	
LAT16 top tray face 4.0" from center of target	2.64 ± .03	17.8	
Configuration – Z-axis vertical, Cosmic rays sea level			Tracker Trig Rate [Hz]
3-in-a-row Tracker Trigger			
EM1			21.5 ± .2
EM2			23.4 ± .2
Tower			25.7 ± .9
LAT16			309 ± 9
Configuration – Z-axis vertical, Cosmic rays at sea level. Test device is between the muon telescope paddles.		Frac of Tel Trigs that should make Trker Trigs	Muon Telescope Trig Rate [Hz]
Old 24"x24" muon telescope (75" spacing)			2.97 ± .04
EM2		.70 ± .01	
Tower		.71 ± .01	
New 15.5" x 15.5" muon telescope (75" spacing)			.89 ± .02
EM2		1.00 ± .02	
Tower		1.00 ± .02	

Ran the MC for different distances between the target and tracker front face and got:

$k := 0..4$

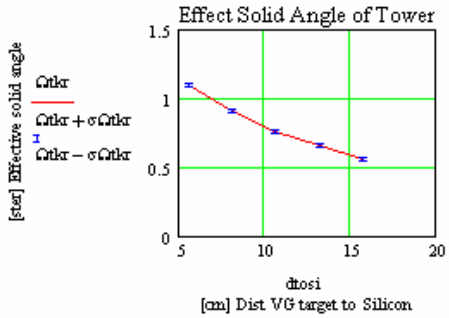
$dist_k :=$	$\Omega tkr_k :=$	$\sigma\Omega tkr_k :=$
$1.0 \cdot 2.54$	1.098	.014
$2.0 \cdot 2.54$	.910	.015
$3.0 \cdot 2.54$	.753	.013
$4.0 \cdot 2.54$	.658	.012
$5.0 \cdot 2.54$	.555	.011

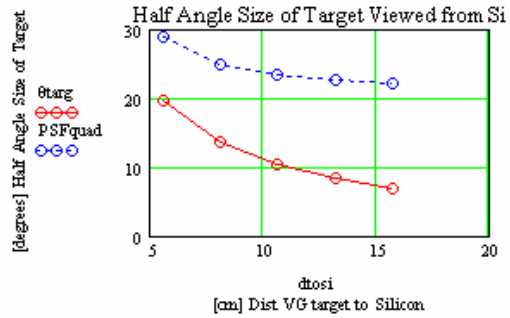
$dtosi_k := dist_k + 3.0$

$\theta targ_k := \frac{rtarg}{dtosi_k} \cdot \frac{180}{\pi}$

$PSFtower := 21$ [deg] Expected tower psf at 17 MeV

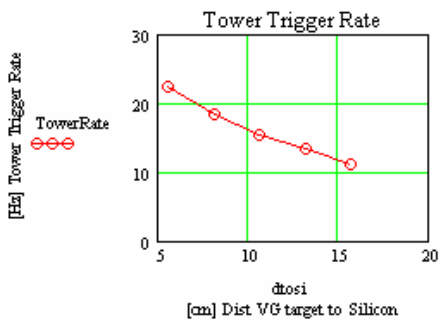
$PSFquad_k := \sqrt{(\theta targ_k)^2 + PSFtower^2}$





$BgoRate := 3$ [Hz] What the VG is doing now

$TowerRate_k := BgoRate \cdot \frac{\Omega tkr_k}{\Omega\_bgo}$



$$TowerRate = \begin{bmatrix} 22.257 \\ 18.446 \\ 15.264 \\ 13.338 \\ 11.25 \end{bmatrix}$$ [Hz]