

# Spin Rotator Studies

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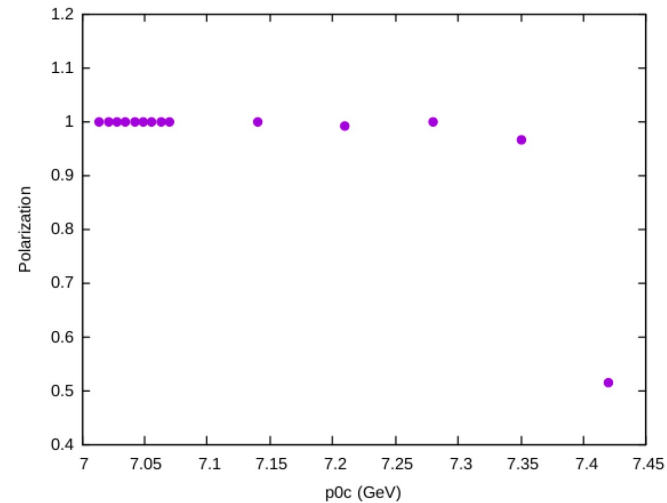
M. Roney

# Energy Scan Studies



- We are probing the stable R156 spin rotator for various energies up to +5% from the nominal
- 100 particles across 15,000 turns (running currently up to 25,000)
- Ongoing - more tracking studies in the 7.25 to 7.45 GeV region

Beam Polarization at Various Energies

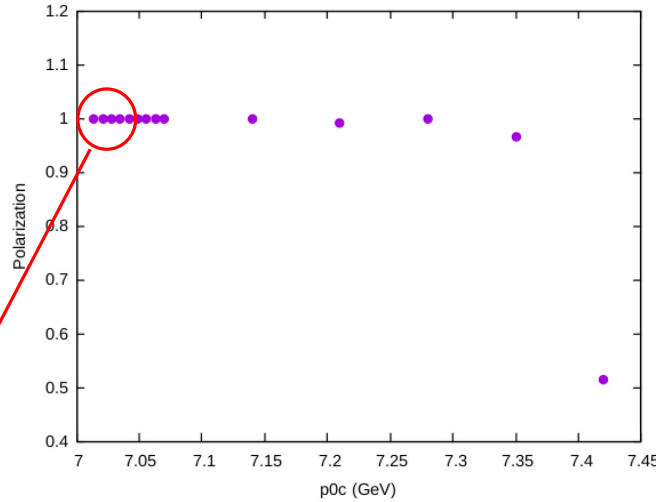


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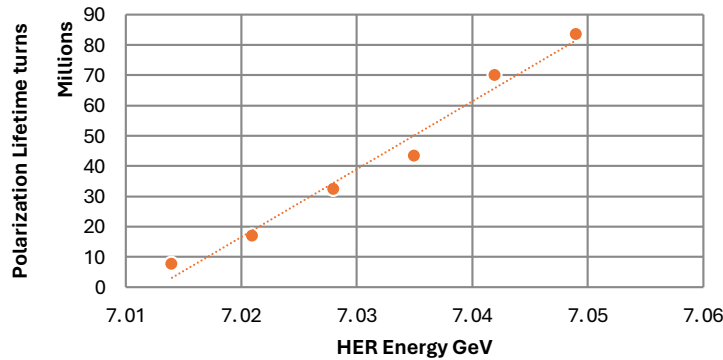
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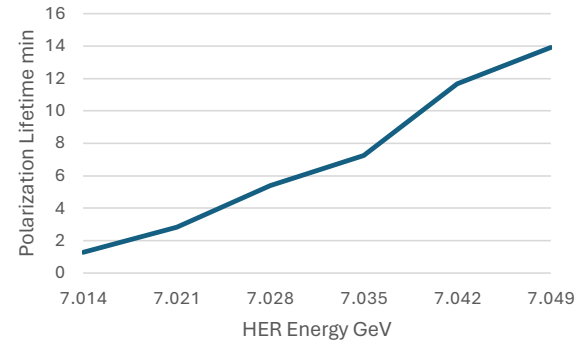


Recall that beam lifetime  
In design SuperKEKB  
Is 6 min.  
Currently working with  
~10 min. lifetimes

Polarization Lifetime from LTT



Polarization Lifetime (min)



# Future Plans



- Study the effect of placement tolerances for machine elements
- Translate Rot\_156 from BMAD to SAD and repeat studies
- Touschek Scattering
- Beam-Beam effects
- And more...?

Backup slides



# Linac Beam Parameters for KEKB/SuperKEKB

Stage	KEKB (final)		Phase-I (achieved)		Phase-II (achieved)		Phase-III (interim)		Phase-III (final)	
	e+	e-	e+	e-	e+	e-	e+	e-	e+	e-
Beam Energy	3.5 GeV	8.0 GeV	4.0 GeV	7.0 GeV	4.0 GeV	7.0 GeV	4.0 GeV	7.0 GeV	4.0 GeV	7.0 GeV
Stored current	1.6 A	1.1 A	1.0 A	1.0 A	-	-	1.8 A	1.3 A	2.8 A	2.0 A
Life time (min.)	150	200	100	100	-	-	-	-	6	6
Bunch charge (nC)	primary e- 10		primary e- 8		0.5	1	2	2	primary e- 10	
	→ 1	1	→ 0.4	1					→ 4	4
Norm. Emittance ( $\gamma\beta\epsilon$ ) (mrad)	1400	310	1000	130	200/40 (Hor./Ver.)	150	150/30 (Hor./Ver.)	100/40 (Hor./Ver.)	<u>100/15</u> (Hor./Ver.)	<u>40/20</u> (Hor./Ver.)
Energy spread	0.13%	0.13%	0.50%	0.50%	0.16%	0.10%	0.16%	0.10%	<u>0.16%</u>	<u>0.07%</u>
Bunch / Pulse	2	2	2	2	2	2	2	2	2	2
Repetition rate	50 Hz		25 Hz		25 Hz		50 Hz		50 Hz	
Simultaneous top-up injection (PPM)	3 rings (LER, HER, PF)		No top-up		Partially		4+1 rings (LER, HER, DR, PF, PF-AR)		4+1 rings (LER, HER, DR, PF, PF-AR)	



Gradual improvements keeping light source injections