

# monochromatization scenarios



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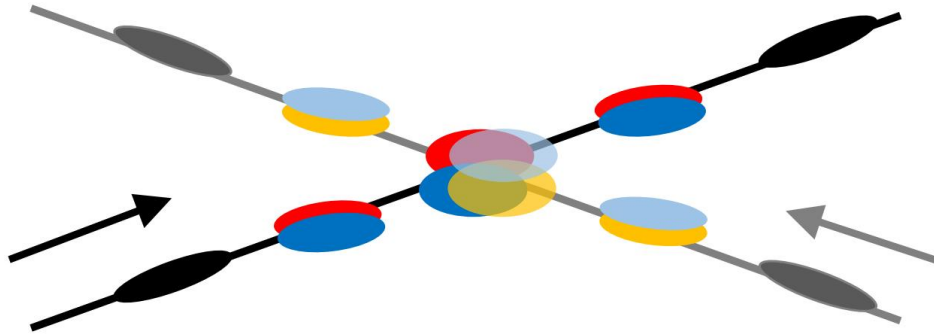
thanks to Alain Blondel, Anton Bogomyagkov, Vera Cilento, David d'Enterria, Dima El Khechen, Angeles Faus-Golfe, Patrick Janot, Andrea Latina, Eugene Levichev, Kazuhito Ohmi, Katsunobu Oide, Emmanuel Perez, Cecile Rimbault, Dmitry Shatilov, Jochem Snuverink, Valery Telnov, Kaoru Yokoya, Alexander Zholents

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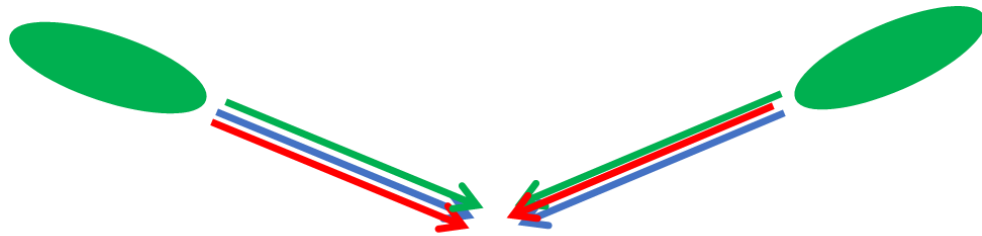


# three scenarios

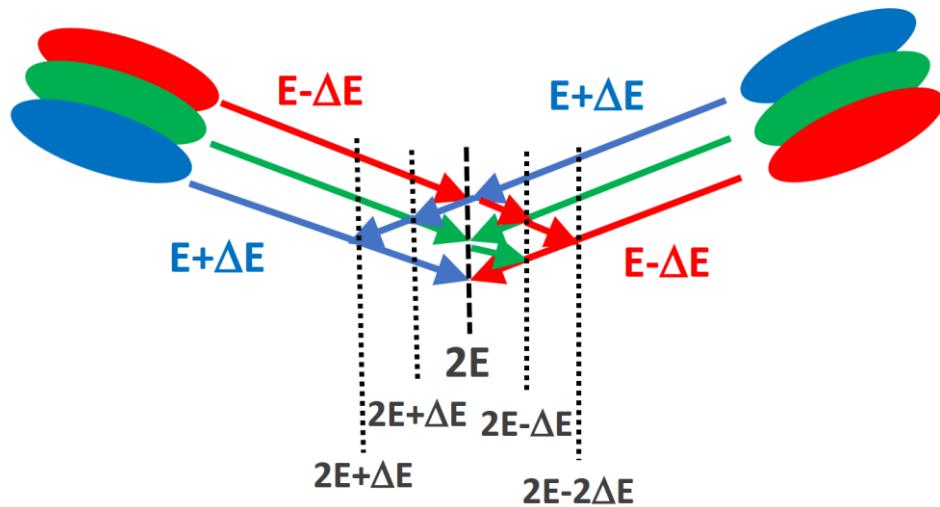
baseline  
with  
crab  
cavities



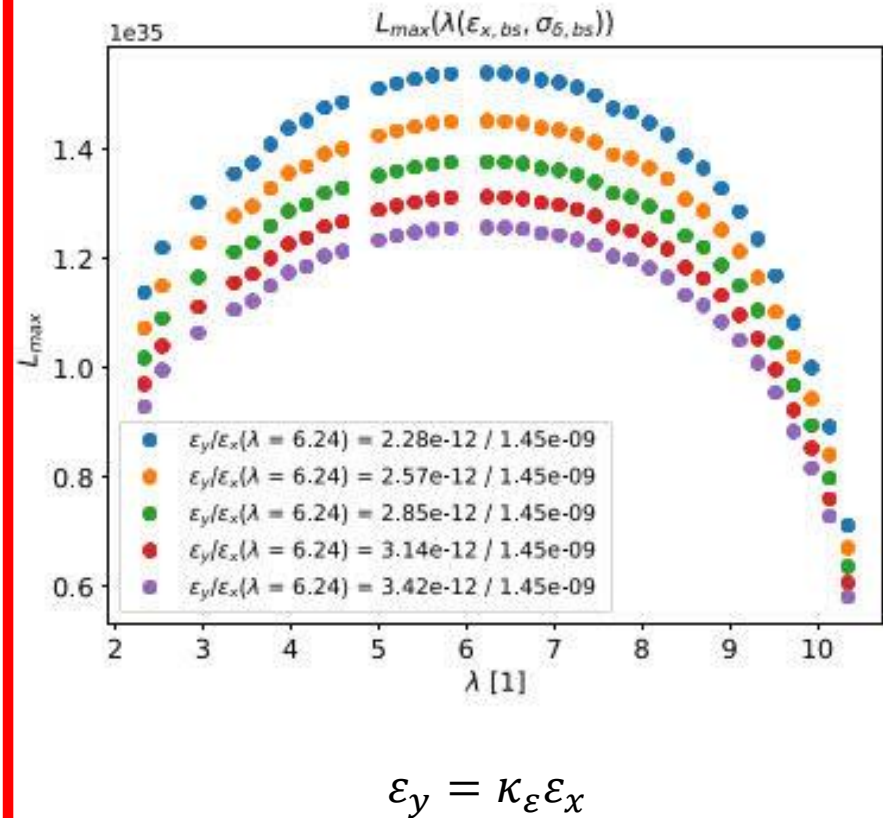
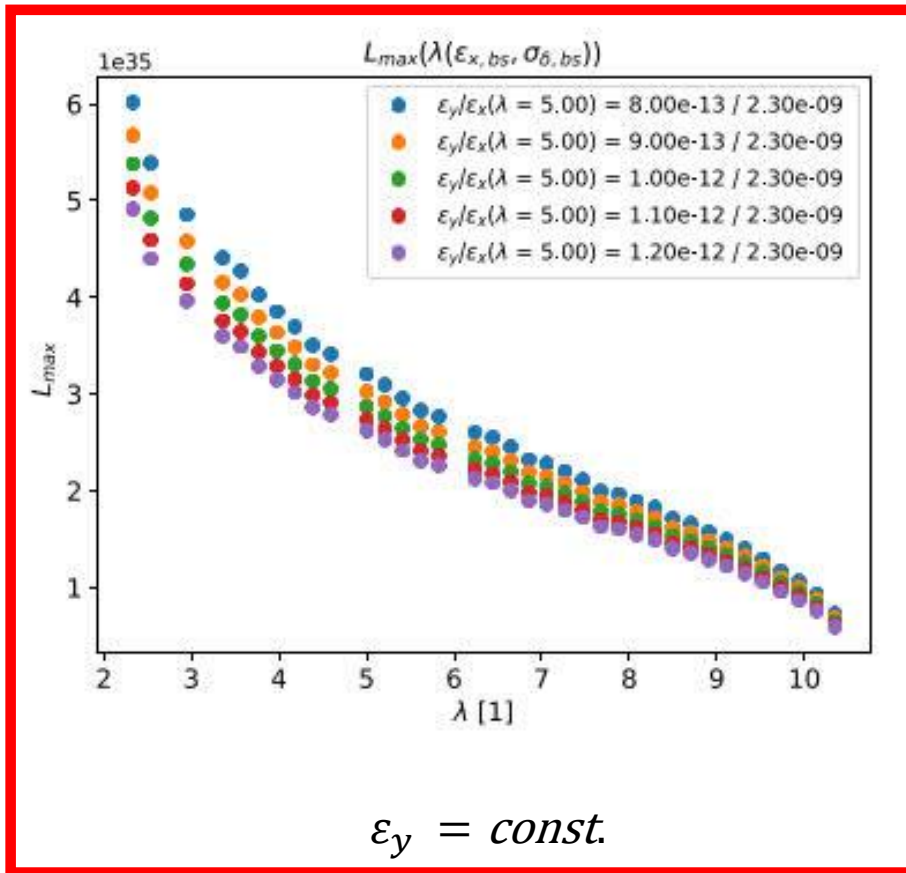
optimized  
by Alan



alternatives  
with  
crossing  
angle



# two cases for scenario 1



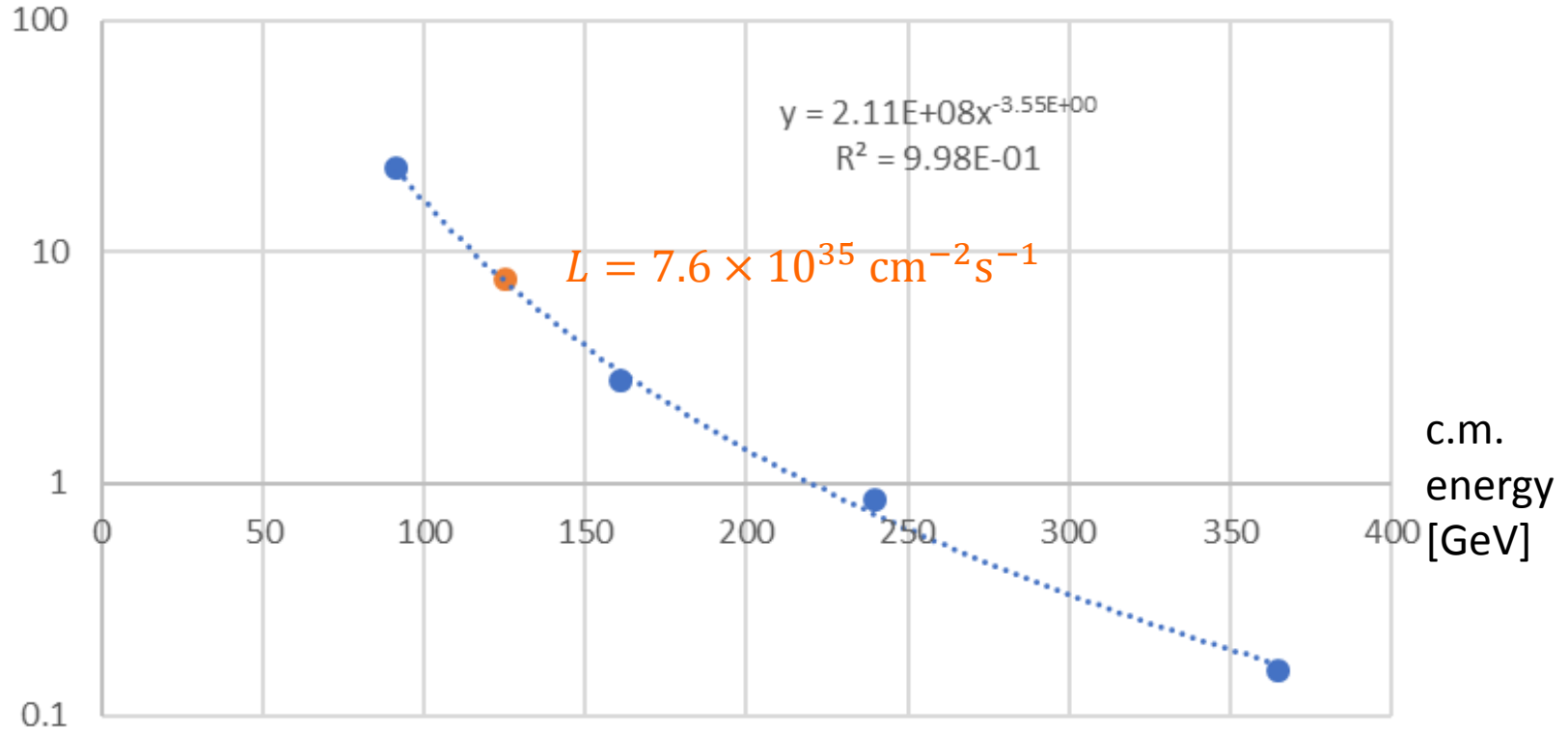
example: pick  $\lambda \sim 5$ ,  $\sigma_W \approx 6$  MeV

**assume optimum case**

# optimum case for scenario 2

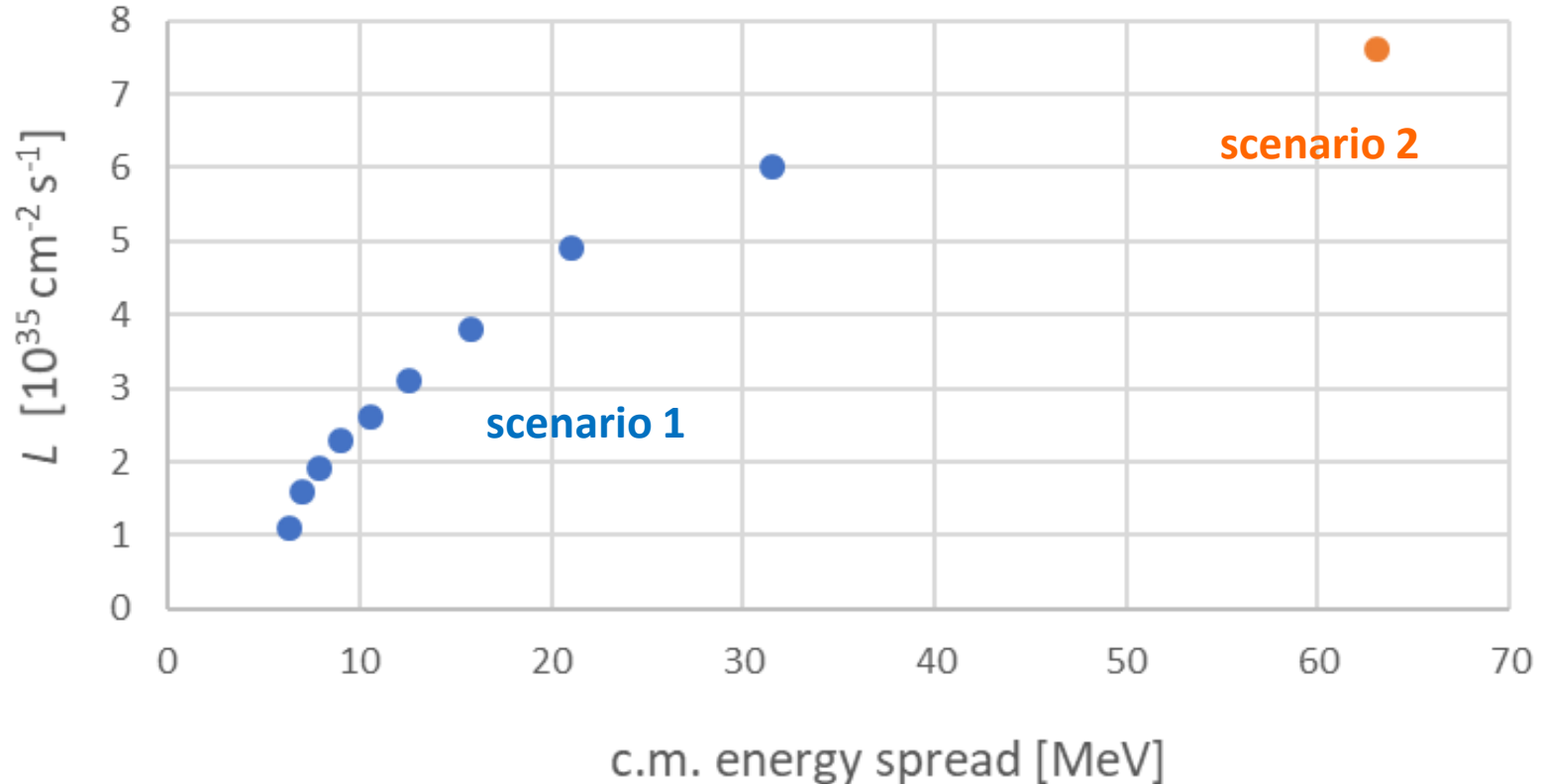
peak luminosity  
[ $10^{35} \text{ cm}^{-2} \text{ s}^{-1}$ ]

lumi-fit

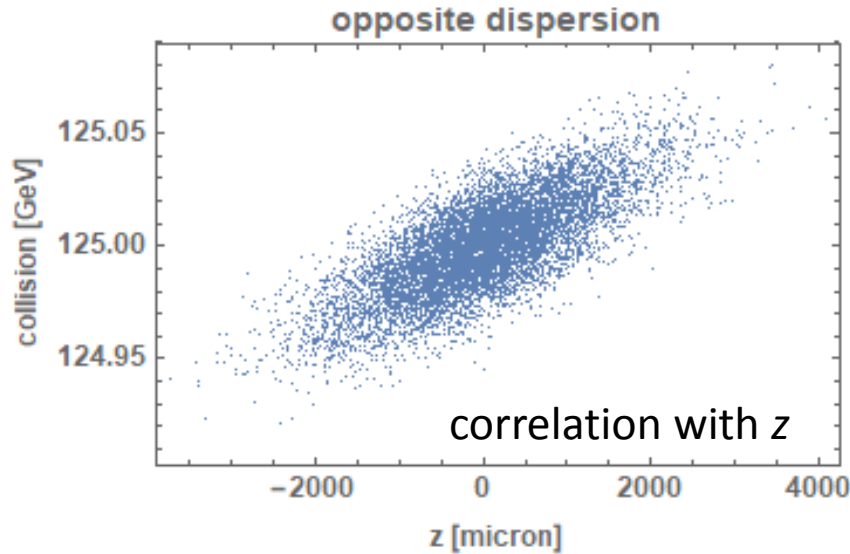


# peak luminosity versus $\sigma_W - 1$

luminosity versus c.m. energy spread



# scenario 3: $z$ - $E_{\text{cm}}$ correlation of luminosity events



**built-in  
energy scan**

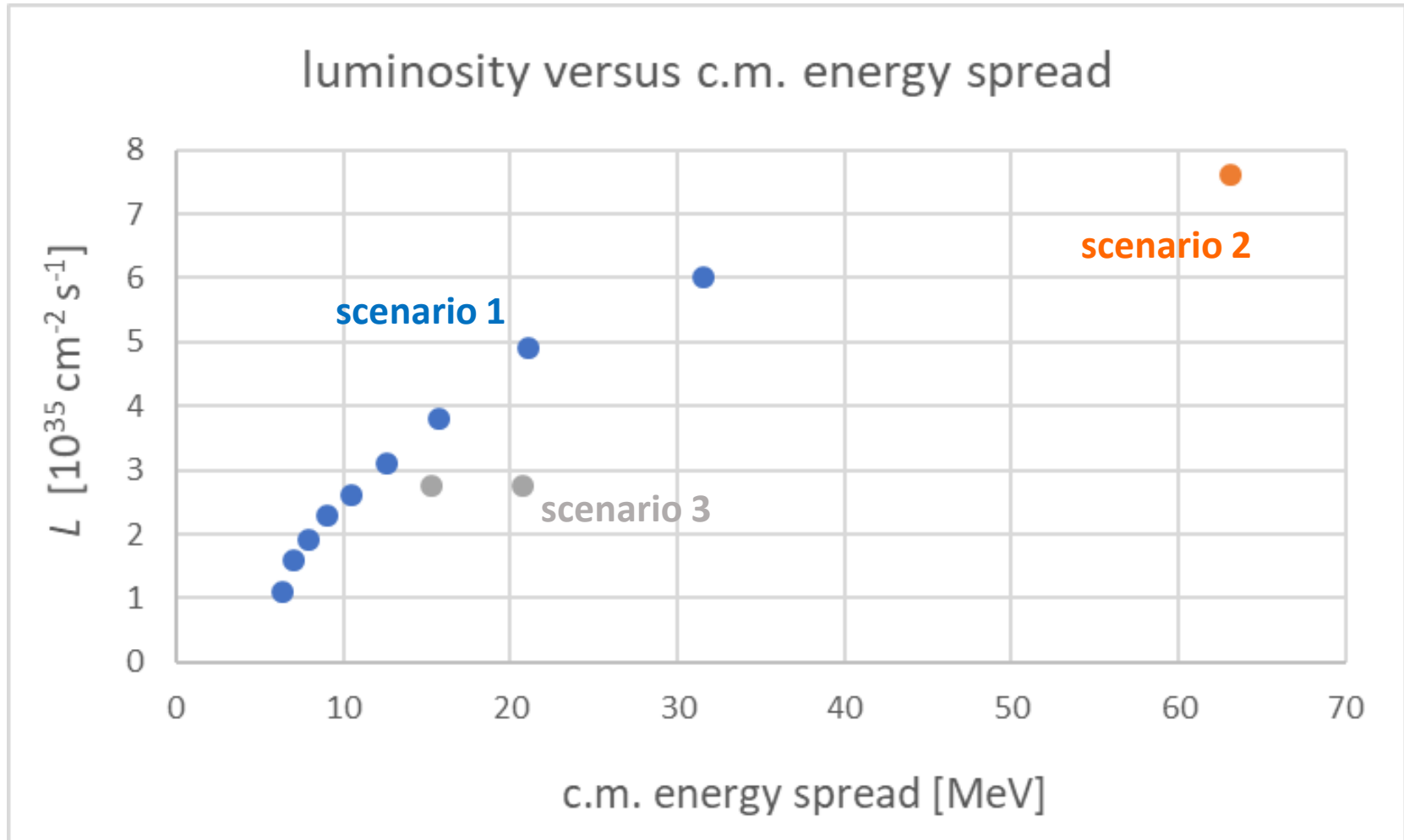
$$\sigma_W \sim 20.7 \text{ MeV}$$

$$\sigma_W \sim 15.3 \text{ MeV over } 3 \mu\text{m}$$

Guinea-Pig simulation

tentative parameters at 62.5 GeV		self-consistent simulation w $\theta_c=30$ mrad (total)	
$D_x^*$	0.105 m	$\sigma_x^*$	80 $\mu\text{m}$ (with dispersion)
$\beta_x^*$	9 cm	$\sigma_{x,\beta}^*$	15 $\mu\text{m}$
$\sigma_\delta$	0.0715%	$\sigma_{\delta,\text{tot}}$	0.075 %
$\varepsilon_{x,\text{SR}}$	0.51 nm	$\varepsilon_{x,\text{tot}}$	2.5 nm
$\sigma_y$	45 nm ( $\varepsilon_y = 2 \text{ pm}$ , $\beta_y^* = 1 \text{ mm}$ )	$L$	$2.75 \times 10^{35} \text{ cm}^{-2}\text{s}^{-1}$
$N_b$	$6 \times 10^{10}$	$\xi_y$	0.061
$n_b$	14170		

# peak luminosity versus $\sigma_W - 2$



# integrated luminosity

CDR assumptions:

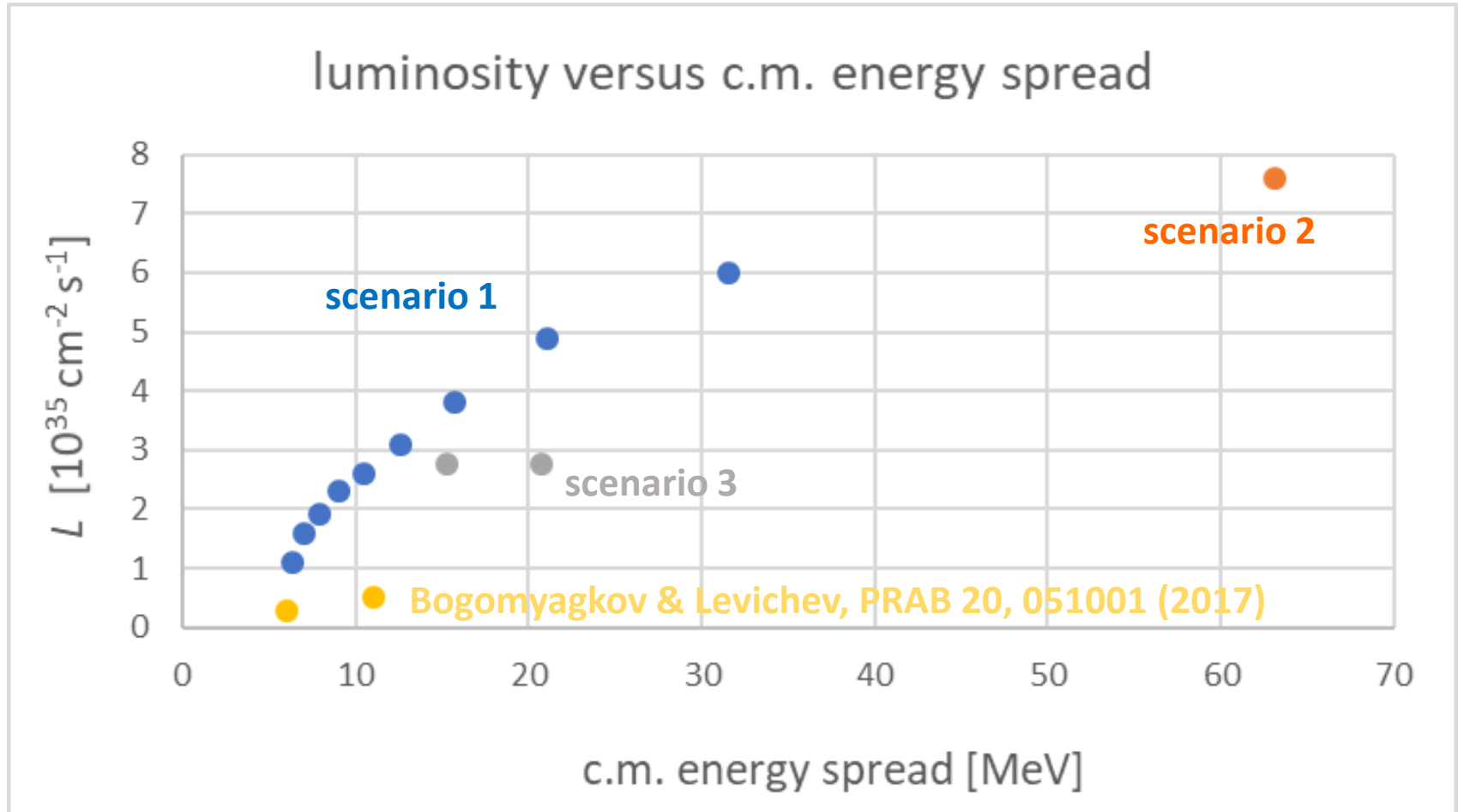
185 physics days per year,  
physics efficiency of 75%

$$10^{35} \text{ cm}^{-2}\text{s}^{-1} \rightarrow 1.2 \text{ ab}^{-1}/\text{year}/\text{IP}$$

$$7.6 \times 10^{35} \text{ cm}^{-2}\text{s}^{-1} \rightarrow 9.1 \text{ ab}^{-1}/\text{year}/\text{IP}$$



# peak luminosity versus $\sigma_W - 3$



are our scenarios too optimistic?

# raw data for plot

scenario		sigma_W[MeV]	Luminosity [1E35/cm^2/s]
scenario 1	2	31.55464	6
	3	21.03643	4.9
	4	15.77732	3.8
	5	12.62186	3.1
	6	10.51821	2.6
	7	9.015611	2.3
	8	7.88866	1.9
	9	7.012142	1.6
	10	6.310928	1.1
	scenario 2	1	63.10928
scenario 3		20.7	2.75
		15.3	2.75