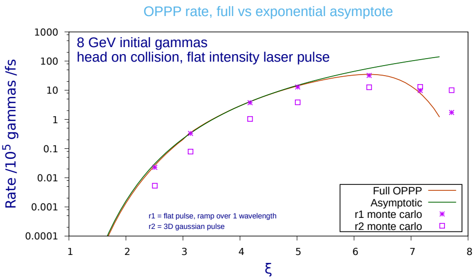
OPPP/BPPP full,exponential and mc



- Validate OPPP/BPPP rate: full/fit/mc
- oppp fit:
  $$\frac{3}{16}\sqrt{\frac{3}{2}}\,\chi\, e^{-\frac{8}{3\chi}(1-1/15\xi^2)},\quad \chi = \xi\frac{k\cdot k_i}{m^2}$$
- fit validity: $\xi \gtrsim 1/\sqrt{\chi} \gg 1,\ (2 \lesssim \xi \lesssim 5.5)$
- Why does the rate decline for higher ξ?
- threshold number of laser photons,
  $$n_{\text{min}} = \frac{2m^2(1+\xi^2)}{k\cdot k_i}$$
- More intense laser provides more energy, but the pair rest mass also increases
- Gaussian pulse compared to flat pulse: less ξ overall
- Monte carlo can help understand experimental fits

IPstrong v1.1.00 data sets, update 17/11/2020

- More accurate HICS for high ξ, simulated rate=99.9% of true rate
- 1000 bxs "provisional" JETI40, e-laser, 16.5,17.5 GeV, w0=3,4,5,6.5,8 μm
- "Ideal" datasets (No crossing angle, no emittance, no energy spread)
- Validation: no statistical significance for different Nmp, Zmesh, Lookup table

Aug-Oct 2020 Data Runs, bunch/pulse crossings completed

Experiment Config	$w_0 = 3\mu$m	3.5μm	4.0μm	4.5μm	5.0μm	6.5μm	8.0μm	10.0μm	13.0μm	15.0μm	20.0μm	50.0μm	100.0μm
peak SQED ξ	5.12	4.44	3.88	3.45	3.1	2.39	1.94	1.553	1.195	1.04	0.78	0.31	0.15
peak SQED χ (16.5 GeV)	0.9	0.79	0.69	0.61	0.55	0.42	0.34	0.275	0.212	0.183	0.138	0.055	0.028
JETI40 e-laser 16.5 GeV	10000	6000	5994	6000	6000		10000	1000	1000	1000	500	5000	500
JETI40 e-laser 16.5 GeV (prov)	1000	1000	1000	1000	1000	1000	1000						
JETI40 e-laser 17.5 GeV	1000	1000	1000	1000	1000		1000						
JETI40 e-laser 17.5 GeV (prov)	1000	1000	1000	1000	1000	1000	1000						
JETI40 g-laser 16.5 GeV	5000	2000	2000	2000	2000	2000	2000						
JETI40 g-laser 17.5 GeV													
JETI40 ics-laser 16.5 GeV													
JETI40 ics-laser 17.5 GeV													
JETI40 misalignments													
	pulse shape	$w_0 = 3.0\mu$m	$w_0 = 4.0\mu$m	$w_0 = 5.0\mu$m	$w_0 = 6.0\mu$m	$w_0 = 7.0\mu$m	$w_0 = 8.0\mu$m	$w_0 = 9.0\mu$m	$w_0 = 10.0\mu$m	$w_0 = 11.0\mu$m	$w_0 = 12.0\mu$m	$w_0 = 16.0\mu$m	$w_0 = 20.0\mu$m
peak SQED ξ	gauss	16.7	12.53	10.03	8.35	7.16	6.27	5.57	5.01	4.56	4.18	3.133	2.506
peak SQED χ (16.5 GeV)	gauss	2.96	2.22	1.78	1.48	1.27	1.11	0.99	0.89	0.81	0.74		
phaseII e-laser 16.5 GeV	gauss	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000		
phaseII e-laser 17.5 GeV	gauss	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000		
phaseII g-laser 16.5 GeV	gauss	2000	1000	1000	1000	1000	1000	2000	2000	2000	2000		
phaseII g-laser 17.5 GeV													
phaseII OPPP ideal 8.0 GeV	flat	100	100	100	100	100	100		100		100	100	100
phaseII OPPP ideal 8.0 GeV	gauss	100	100	100	100	100	100		100		100	100	100
phaseII ics-laser 16.5 GeV							1000						
phaseII ics-laser 17.5 GeV													
phaseII misalignments													

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