1 Python Plots
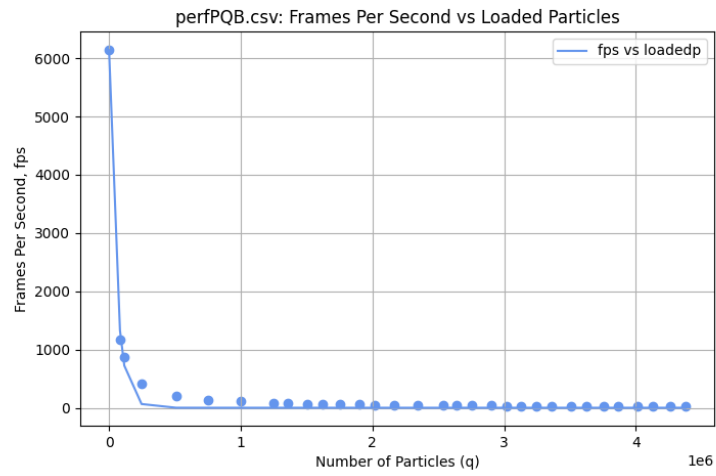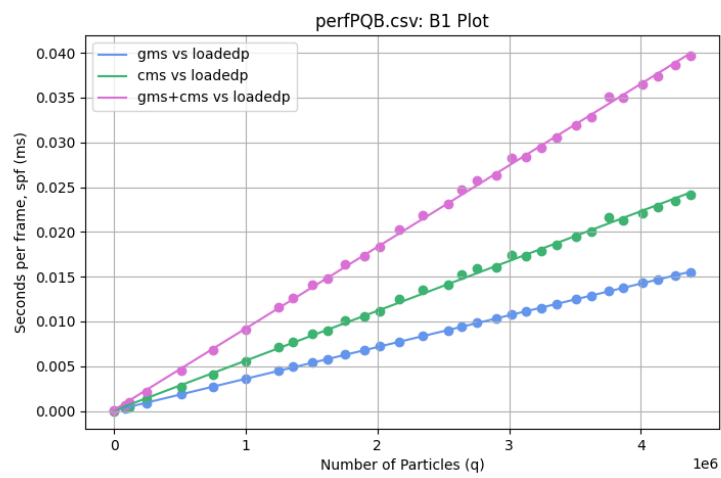
Figure 1: *fps*

Figure 2: *spf*

Table 1: *Compute, graphics, GPU spf in milliseconds with GPU and CPU fps performance by number of particles where particle-cell density,* max_p *is 8, collision fraction,* F*, is 0.5, and* $mmrr$ *is* 4.35 x 10^{-3} *ms.*

Particles in Dataset	Compute (Narrow) $mcpt$	Graphics (Broad) $mgpt$	GPU $mcput$	Total $maxfps$
32	6.14e-06	1.02e-05	1.63e-05	6512
82944	3.70e-04	3.02e-04	6.72e-04	1179
115712	5.15e-04	4.15e-04	9.30e-04	891
246784	1.26e-03	8.81e-04	2.14e-03	420
508928	2.71e-03	1.80e-03	4.52e-03	206
754688	4.06e-03	2.68e-03	6.74e-03	140
1000448	5.41e-03	3.54e-03	8.95e-03	106
1246208	7.06e-03	4.44e-03	1.15e-02	83
1360896	7.71e-03	4.85e-03	1.26e-02	77
1508352	8.56e-03	5.36e-03	1.39e-02	69
1623040	8.81e-03	5.72e-03	1.45e-02	66
1754112	9.98e-03	6.25e-03	1.62e-02	60
1901568	1.03e-02	6.70e-03	1.70e-02	57
2016256	1.10e-02	7.10e-03	1.81e-02	54
2163712	1.23e-02	7.65e-03	2.00e-02	49
2343936	1.30e-02	8.26e-03	2.12e-02	46
2540544	1.40e-02	8.91e-03	2.29e-02	43
2638848	1.51e-02	9.29e-03	2.43e-02	40
2753536	1.57e-02	9.74e-03	2.54e-02	39
2900992	1.58e-02	1.02e-02	2.60e-02	38
3015680	1.74e-02	1.07e-02	2.81e-02	35
3130368	1.73e-02	1.10e-02	2.83e-02	35
3245056	1.79e-02	1.14e-02	2.93e-02	34
3359744	1.85e-02	1.18e-02	3.03e-02	33
3507200	1.93e-02	1.24e-02	3.17e-02	31
3621888	1.99e-02	1.27e-02	3.27e-02	30
3752960	2.16e-02	1.33e-02	3.49e-02	29
3867648	2.11e-02	1.36e-02	3.47e-02	29
4015104	2.19e-02	1.42e-02	3.61e-02	27
4129792	2.27e-02	1.45e-02	3.73e-02	27
4260864	2.35e-02	1.50e-02	3.85e-02	26
4375552	2.41e-02	1.54e-02	3.94e-02	25

Table 2: *No caption*

FPS	CPU Time(ms)	Commpute Time(ms)	Graphics Time(ms)	Number particles
6153	0	0.01	0.01	32
1161	1	0.37	0.31	82944
874	1	0.52	0.43	115712
414	2	1.27	0.90	246784
204	5	2.72	1.84	508928
139	7	4.06	2.73	754688
106	9	5.52	3.60	1000448
82	12	7.14	4.51	1246208
76	13	7.75	4.92	1360896
68	15	8.66	5.44	1508352
65	15	8.92	5.82	1623040
59	17	10.09	6.32	1754112
56	18	10.53	6.80	1901568
53	19	11.13	7.20	2016256
48	21	12.54	7.75	2163712
44	23	13.53	8.38	2343936
42	24	14.05	9.02	2540544
39	26	15.25	9.44	2638848
38	27	15.90	9.85	2753536
37	27	16.01	10.29	2900992
35	29	17.44	10.79	3015680
34	29	17.30	11.12	3130368
33	30	17.92	11.52	3245056
32	31	18.55	11.94	3359744
31	33	19.48	12.48	3507200
30	34	19.99	12.88	3621888
28	36	21.69	13.42	3752960
28	36	21.33	13.72	3867648
27	37	22.13	14.29	4015104
26	38	22.74	14.67	4129792
25	39	23.48	15.13	4260864
25	41	24.17	15.51	4375552