Running on CPU:

For 1000 particles:


```
Select mproffi2@gal-i9:~/nbodycuda                                      —    □    ×
9      -0.0593142      0        0        0        0      0.990917      -0.418612      1.4256  0      2.1384  0.627917
       0        0        0      0.978628      1.59754 -0.820751      0      -1.23113      -2.39631      0      0
       0      0.902097      0.384316      -0.969172      0      -1.45376      -0.576474      0      0      0
       0.941754      -0.221069      -1.62828      0      -2.44243      0.331603      0      0      0      0
0.973291      -0.0792119      1.04725 0      1.57088 0.118818      0      0      0      0      0.928306      0
.0993255      0.457101      0      0.685652      -0.148988      0      0      0      0      0.979098      -
0.170814      1.26044 0      1.89066 0.256221      0      0      0      0      0.98817 -1.35347      0.17009
0      0.255135      2.0302 0      0      0      0      0.999007      1.11259 -0.727431      0      -1.09115
-1.66888      0        0        0        0      0.999398      0.737741      1.57756 0      2.36634 -1.10661      0
0      0      0.931987      1.31187 -1.70242      0      -2.55362      -1.96781      0      0      0
0      0.940375      0.288769      -0.11459      0      -0.171885      -0.433153      0      0      0
0.998111      -0.749617      0.653705      0      0.980557      1.12443 0      0      0      0      0.980895
0.512479      0.799954      0      1.19993 -0.768719      0      0      0      0      0.902862      -0.58542
2      -0.484222      0      -0.726333      0.878133      0      0      0      0      0.952955      -2.83166
-0.417225      0      -0.625837      4.24749 0      0      0      0      0.908657      0.441151      0.478657
0      0.717986      -0.661726      0      0      0      0      0.944076      0.640377      0.205036      0
0.307553      -0.960565      0      0      0      0      0.935962      -0.111518      -0.665244      0      -
0.997865      0.167278      0      0      0      0      0.973283      -0.581639      0.178353      0      0
.26753  0.872458      0        0        0      0.967028      1.12604 -1.45663      0      -2.18494      -
1.68907 0      0        0        0      0.913146      2.61673 0.479489      0      0.719233      -3.9251 0      0
0      0.952591      0.0747423      -1.98056      0      -2.97084      -0.112113      0      0      0
0      0.981689      1.04598 -0.0669942      0      -0.100491      -1.56898      0      0      0      0
.982381 0.029476      -0.0328874      0      -0.0493311      -0.044214      0      0      0      0      0.971648
0.851053      -0.643385      0      -0.965077      -1.27658      0      0      0      0      0.968074      -
1.69709 -0.495971      0      -0.743956      2.54563 0      0      0      0      0.901164      0.191351      0
.76627  0      1.1494  -0.287027      0      0      0      0      0.949319      1.47564 -0.077501      0      -
0.116252      -2.21346      0      0      0      0      0.996393      -0.523566      -0.305531      0      -
0.458296      0.78535 0      0      0      0      0.901151      -3.05595      0.442661      0      0.663992
4.58393 0      0        0        0      0.962925      -2.42652      1.52358 0      2.28538 3.63978 0      0      0
0      0.967371      -0.416903      1.37525 0      2.06287 0.625354      0      0      0      0      0.94003
.0988774      -0.509534      0      -0.764301      -0.148316      0      0      0      0      0.900405      0
.625432 -1.25885      0      -1.88827      -0.938149      0      0      0      0      0.911383      0.706724
-0.576115      0      -0.864173      -1.06009      0      0      0      0      0.928385      -1.13154      -
.935059      0      -1.40259      1.69731 0      0      0      0      0.905739      1.42047 1.80106 0      2
.70159  -2.1307 0      0        0      0.927978      -0.479688      -1.96927      0      -2.9539 0.719533
0      0      0      0.993195      -0.151357      0.0228403      0      0.0342605      0.227035      0
0      0      0.930829      -0.627113      -0.912301      0      -1.36845      0.940669      0      0
0      0      0.987196      -0.648548      -0.585779      0      -0.878669      0.972821      0      0      0
0      0.902328      -0.0295448      0.977431      0      1.46615 0.0443172      0      0      0      0      0
.985219 1.05966 1.55991 0      2.33987 -1.58949      0      0      0      0      0.904039      1.93866 0.238956
0      0.358433      -2.90799      0      0      0      0      0.960276      -0.456651      -0.271557      0
-0.407335      0.684976      0      0      0      0      0.964676      0.0185811      -1.03768      0      -
1.55652 -0.0278716      0      0      0      0      0.910972      -1.21017      0.32229 0      0.483435      1
.81525  0      0        0        0      0.989196      -0.359319      -1.72171      0      -2.58256      0.538979
0      0      0      0.967445      -0.159318      -1.67841      0      -2.51761      0.238977      0
0      0      0.98841 0.68929 -0.799246      0      -1.19887      -1.03394      0      0      0      0
0.916581      0.865527      -0.44406      0      -0.66609      -1.29829      0      0      0      0
.962464 0.857472      1.57529 0      2.36294 -1.28621      0      0      0      0
runtime(CPU): 0.0770628 s
```

For 10000 particles:

```
mproffi2@gal-i9:~/nbodycuda

0        0        0        0.959594        0.0563429        -1.1445 0        -1.71675        -0.0845144        0        0        0
0        0.925695        -0.0816884        1.15351 0        1.73027 0.122533        0        0        0        0        0.948802
-0.708478        1.5448  0        2.3172  1.06272 0        0        0        0        0.983205        -2.15002        -1.88893
0        -2.8334 3.22504 0        0        0        0        0.98814 -0.848857        -1.71367        0        -2.5705 1.27329
0        0        0        0        0.931297        0.761533        -0.0897721        0        -0.134658        -1.1423 0        0
0        0        0.962502        0.319381        2.64702 0        3.97053 -0.479072        0        0        0        0
.975978 -0.997137        1.44586 0        2.16878 1.49571 0        0        0        0        0.937839        0.687729        -
1.44879 0        -2.17318        -1.03159        0        0        0        0        0.955022        -2.0484 -0.019151        0
-0.0287265        3.07261 0        0        0        0        0.909029        -0.197287        -1.16233        0        -1.7435
0.295931        0        0        0        0        0.968237        0.60839 0.398212        0        0.597318        -0.91258
5        0        0        0        0.993683        1.32632 -0.39583        0        -0.593745        -1.98948        0
0        0        0        0.947131        0.399412        -0.336512        0        -0.504767        -0.599117        0        0
0        0        0.966979        0.28129 -0.748969        0        -1.12345        -0.421935        0        0        0        0
0.98886 -1.67018        0.48221 0        0.723316        2.50527 0        0        0        0        0.941875        1.0059 1
.98775 0        2.98162 -1.50885        0        0        0        0        0.941585        0.853753        1.0601 0        1
.59015 -1.28063        0        0        0        0        0.92963 0.964852        1.73308 0        2.59962 -1.44728        0
0        0        0        0.954796        -0.473597        -0.485015        0        -0.727523        0.710395        0        0
0        0        0.94492 -1.26048        0.373085        0        0.559627        1.89072 0        0        0        0
.94088  0.00975804        0.0162337        0        0.0243505        -0.0146371        0        0        0        0        0.916814
1.95198 1.62215 0        2.43323 -2.92796        0        0        0        0        0.973008        1.67517 0.0504765        0
0.0757147        -2.51275        0        0        0        0        0.964285        0.0925091        -1.01815        0        -
1.52723 -0.138764        0        0        0        0        0.963331        0.134329        0.444376        0        0.666564
-0.201493        0        0        0        0        0.952704        0.554008        -0.75365        0        -1.13047        -
0.831013        0        0        0        0        0.974081        -1.56862        0.933475        0        1.40021 2.35292
0        0        0        0        0.958321        1.21295 -0.691709        0        -1.03756        -1.81942        0        0
0        0        0.917081        1.40297 -0.557811        0        -0.836716        -2.10445        0        0        0        0
0.970099        0.155573        -0.707192        0        -1.06079        -0.233359        0        0        0        0        0
.94132  -1.94115        -0.202369        0        -0.303553        2.91173 0        0        0        0        0.936842        -
0.0682486        0.734667        0        1.102   0.102373        0        0        0        0        0.952202        -1.81041
-0.25776        0        -0.386641        2.71562 0        0        0        0        0.976296        -0.469168        -0.44591
1        0        -0.668866        0.703751        0        0        0        0        0.93943 0.773922        1.51364 0        2
.27045  -1.16088        0        0        0        0        0.961205        0.0954808        -0.39792        0        -0.59688
1        -0.143221        0        0        0        0        0.966615        -0.141026        -1.71861        0        -2.57791
0.211539        0        0        0        0        0.906485        -1.79884        -0.163374        0        -0.245061        2
.69826  0        0        0        0.959844        1.64557 -0.176154        0        -0.264231        -2.46835        0
0        0        0        0.901194        0.171069        0.0672062        0        0.100809        -0.256604        0        0
0        0        0.979549        -0.0108944        -0.928831        0        -1.39325        0.0163416        0        0        0
0        0.915782        -0.867328        -0.900393        0        -1.35059        1.30099 0        0        0        0
.932292 -1.28249        0.764557        0        1.14684 1.92373 0        0        0        0.93554 1.9651  2.62991
0        3.94486 -2.94764        0        0        0        0        0.905908        -0.370449        -0.440436        0        -
0.660653        0.555673        0        0        0        0        0.960097        0.885017        -0.853082        0        -
1.27962 -1.32752        0        0        0        0        0.909675        0.313504        -1.31825        0        -1.97738
-0.470256        0        0        0        0        0.922677        1.71401 0.323903        0        0.485855        -2.57102
0        0        0        0        0.93122 1.36971 0.708452        0        1.06268 -2.05457        0        0        0        0
0.923934        -0.846044        0.432503        0        0.648755        1.26907 0        0        0        0        0.96226
0.340026        -0.993538        0        -1.49031        -0.51004        0        0        0        0        0.949688        0
.666393 -1.37753        0        -2.06629        -0.999589        0        0        0        0        0.994446        1.2789 -
0.721542        0        -1.08231        -1.91835        0        0        0        0
runtime(CPU): 7.00714 s
[mproffi2@gal-i9 nbodycuda]$
```

For 30000 particles:

```
>_ mproffi2@gal-i9:~/nbodycuda                                                    —    □    X

2.01164 0        0         0        0        0.905286        -0.491732        0.51526 0        0.77289 0.737599        0        0
0        0        0.913106        0.286477        -0.259098        0        -0.388647        -0.429716        0        0        0
0        0.915778        -0.578697        -0.484404        0        -0.726607        0.868045        0        0        0        0
0.962449        0.820869        -0.508975        0        -0.763462        -1.2313 0        0        0        0        0.90341
-1.03674        0.109957        0        0.164935        1.55511 0        0        0        0        0.905483        0.584236
-0.854455        0        -1.28168        -0.876354        0        0        0        0        0.932288        -1.09665        -
0.546895        0        -0.820343        1.64497 0        0        0        0        0.909692        -0.176772        0.615803
0        0.923704        0.265158        0        0        0        0        0.902231        0.593844        -1.04814        0
-1.57221        -0.890765        0        0        0        0        0.940853        0.148642        -0.762084        0        -
1.14313 -0.222963        0        0        0        0        0.93202 0.0268907        -0.0463995        0        -0.0695992        -
0.0403361        0        0        0        0        0.931117        -0.23326        1.88161 0        2.82241 0.34989 0        0
0        0.908663        -0.108231        -0.509132        0        -0.763698        0.162347        0        0        0
0        0.973662        3.03867 -0.712695        0        -1.06904        -4.55801        0        0        0        0        0
907109 -0.295677        0.269094        0        0.40364 0.443515        0        0        0        0        0.963777        1
2286        2.38529 0        3.57794 -1.84291        0        0        0        0.955        0.386943        1.45799 0        2
18699        -0.580414        0        0        0        0        0.986954        0.875648        0.618493        0        0.927739
-1.31347        0        0        0        0        0.992202        1.63142 1.30476 0        1.95714 -2.44713        0        0
0        0        0.954301        -0.556183        2.80674 0        4.21011 0.834275        0        0        0        0        0
912502 0.822887        -1.44964        0        -2.17445        -1.23433        0        0        0        0        0.961233
0.423607        1.10592 0        1.65888 -0.63541        0        0        0        0        0.989748        -0.31154        -
0.838956        0        -1.25843        0.46731 0        0        0        0        0.90633 -0.112479        -0.822839        0
-1.23426        0.168718        0        0        0        0        0.932899        1.71214 0.498365        0        0.747548
-2.56821        0        0        0        0.908174        -2.28349        0.115847        0        0.173771        3
42523 0        0        0        0        0.969827        -0.530313        -0.889439        0        -1.33416        0.79547
0        0        0        0.949999        -1.1231 0.855974        0        1.28396 1.68464 0        0        0        0
0.906077        1.30083 -1.23809        0        -1.85713        -1.95124        0        0        0        0        0.95006
0.101951        0.759102        0        1.13865 -0.152927        0        0        0        0        0.977164        2.03243
-0.610477        0        -0.915716        -3.04865        0        0        0        0        0.982914        0.960591        -
1.31121 0        -1.96682        -1.44089        0        0        0        0        0.914945        1.28487 -1.84885        0
-2.77327        -1.9273 0        0        0        0.972999        -1.04292        -0.0340611        0        -0.05109
17        1.56438 0        0        0        0        0.900247        -0.344713        1.71155 0        2.56732 0.517069        0
0        0        0        0.904252        0.422322        2.60358 0        3.90537 -0.633482        0        0        0        0
0.921487        2.48175 -1.9659 0        -2.94886        -3.72262        0        0        0        0        0.983208        -
1.06247 0.861607        0        1.29241 1.59371 0        0        0        0        0.981014        1.6952 -0.466943        0
-0.700415        -2.5428 0        0        0        0        0.970569        1.04328 0.506763        0        0.760145        -
1.56492 0        0        0        0        0.953907        0.147345        -0.698675        0        -1.04801        -0.22101
7        0        0        0        0.937771        -0.686309        0.439153        0        0.658729        1.02946
0        0        0        0.958777        -0.759161        1.27857 0        1.91786 1.13874 0        0        0
0.957459        0.268161        -0.240684        0        -0.361026        -0.402242        0        0        0        0        0
998764 -1.54678        1.20601 0        1.80901 2.32017 0        0        0        0        0.940821        2.10981 -0.22346
8        0        -0.335194        -3.16472        0        0        0        0.902825        1.74917 0.987714        0
1.48157 -2.62376        0        0        0        0        0.922636        -0.371014        -1.48096        0        -2.22144
0.556521        0        0        0        0        0.994139        2.15532 0.495363        0        0.743044        -3.23298
0        0        0        0.984543        -0.179403        0.259887        0        0.389831        0.269105        0
0        0        0        0.949696        -0.397133        0.360423        0        0.540635        0.5957 0        0        0
0        0.914094        1.29543 2.13122 0        3.19683 -1.94315        0        0        0        0        0.906897        0
841122 0.557765        0        0.836648        -1.26168        0        0        0        0        0.970653        1.18927
-0.334302        0        -0.501452        -1.7839 0        0        0        0
runtime(CPU): 64.5509 s
[mproffi2@gal-i9 nbodycuda]$
```

Running on GPU:

For 10000 particles:

```
 mproffi2@gal-i9:~/nbodycuda                                              —    □   X
.97941   -0.361748       -0.448155        0       -0.715274      0.478247      0      -2.20182e-07    -3.96865e-07    0
.926957         -0.020631      -1.03257        0       -1.53917        -0.107579      0      -7.91536e-07    -6.77707
e-07    0       0.941946       -1.21992        -0.0930362      0       -0.301799      1.80272 0       1.29563e-07     -
5.9545e-08      0       0.955329        -0.423135       1.40884 0       2.03962 0.818268       0       -2.05632e-06    3
.36304e-08      0       0.927505        -1.84716        0.989952        0       1.22563 2.88105 0       -1.18821e-07    4
.51086e-08      0       0.920111        0.464919        -0.106839       0       -0.0967114      -0.706082       0       1
.64233e-07      1.59639e-07     0       0.974077        0.0511545       0.110401       0       0.171121        -0.06133
08      0       3.98344e-07     -1.63533e-07    0       0.916062        0.481661       -0.77331        0       -1.08614
-0.820245       0       6.32675e-08     -3.9187e-07     0       0.920938       0.554534       -0.249697       0       -
0.297276        -0.858555       0       8.76872e-06     1.43299e-05     0       0.911349       -0.526408       0.490476
0       0.659309       0.84895 0       8.13219e-08     -6.05641e-08    0       0.908673       -0.224526       0.932147
0       1.35692 0.458912       0       -1.08148e-06    5.47355e-07     0       0.981011       0.22431 1.20378 0       1
.82121  -0.172556       0       1.54466e-07     7.67499e-07     0       0.911829       1.85875 1.08479 0       1.86303
-2.62045        0       1.68632e-07     8.91566e-08     0       0.965671       -2.21487       -0.501433       0       -
1.04271 3.22846 0       -1.48308e-07    1.16666e-08     0       0.982632       0.876961       -0.00433644     0       0
.110986 -1.30545        0       6.11704e-09     -6.55921e-07    0       0.988094       -2.03392       -0.53526        0
-1.06881        2.95469 0       -1.51261e-07    -3.8214e-08     0       0.919294       -0.818589       -2.14667        0
-3.30375        0.930545        0       -1.29781e-07    -1.22772e-07    0       0.986864       1.44345 -2.1238 0       -
2.96681 -2.43219        0       1.07112e-07     -2.60653e-07    0       0.934497       1.64631 0.499217       0       0
.963275 -2.38277        0       2.95235e-07     -1.48747e-07    0       0.991883       -1.68422       1.17828 0       1
.52768  2.66382 0       -3.89204e-07    2.17619e-07     0       0.908017       -0.876744       -0.843024       0       -
1.37178 1.19166 0       3.10381e-08     2.6364e-07      0       0.959566       1.5457 -1.08117        0       -1.40173
-2.44471        0       1.37863e-07     -1.36363e-07    0       0.916416       0.36036 0.955076       0       1.46936
-0.408297       0       2.89964e-07     2.26644e-07     0       0.909995       -0.682196       -1.49793        0       -
2.32019 0.814476        0       -5.93068e-08    -1.61493e-07    0       0.90614 0.758776       -0.335921       0       -
0.398222        -1.174  0       -2.44815e-08    -7.3375e-07     0       0.962537       -0.341453       1.28356 0       1
.86415  0.679953        0       1.51459e-07     4.92214e-07     0       0.981981       0.367682       0.424121        0
0.680309        -0.490295       0       -1.47651e-07    1.5711e-07      0       0.93428 0.566807       1.47537 0       2
.27118  -0.645804       0       1.04294e-07     3.12585e-07     0       0.931116       0.573377       -0.652755       0
-0.894481       -0.940569       0       1.39389e-07     -1.23545e-07    0       0.95544 -0.105244       -2.43704        0
-3.64028        -0.169759       0       -9.6511e-06     -6.10332e-06    0       0.919823       2.35874 -1.34737        0
-1.68894        -3.69012        0       1.09069e-07     -4.8577e-08     0       0.900542       -0.273923       -2.63308
0       -3.95456        0.0549734       0       -1.0566e-08     -1.0294e-07    0       0.920169       -1.41597        0
.449621 0       0.479391        2.16711 0       -1.82947e-07    3.84682e-07    0       0.96458 -0.78818        0.561463
0       0.729879        1.24796 0       1.49902e-07     -4.95775e-07    0       0.990546       -0.775633       1.30756
0       1.84171 1.3292  0       1.09703e-07     -8.57098e-09    0       0.904709       1.80882 1.34844 0       2.24863
-2.51085        0       1.41041e-07     9.03307e-08     0       0.974224       0.188235       0.255083       0       -
.404758 -0.245924       0       -1.95623e-07    5.99774e-07     0       0.976756       0.171884       0.704453        0
1.07121 -0.161417       0       8.32011e-07     3.90746e-07     0       0.904197       1.13775 -0.256546       0       -
.229365 -1.72727        0       2.76417e-07     -1.58793e-07    0       0.902626       0.577678       0.485759
0       0.800144        -0.794503       0       -5.79129e-06    1.55014e-05    0       0.995011       0.589143        -
.346121 0       -0.436115       -0.922966       0       2.19226e-06    -2.79457e-06    0       0.903622        -
.084388 0.236845        0       0.341112        0.157282        0       1.08129e-07    1.8151e-07      0       0
.908954 -0.569912       0.768883        0       1.06774 0.950964        0       -8.81738e-08    3.40614e-07     0       0
.980845 -0.860429       0.900412        0       1.22454 1.40085 0       3.48261e-07    -1.40544e-07    0       0.976075
-0.645676       -0.0440893      0       -0.152068       0.954827        0       -1.73276e-07    -1.01864e-06    0       0
.994166 -0.0421653      0.083263        0       0.118245        0.0738906      0       8.79244e-06    1.11033e-05     0

runtime(GPU): 0.405831 s
```

For 30000 particles:

```
mproffi2@gal-i9:~/nbodycuda
        -1.91268e-07    4.07988e-08     0       0.913087        -0.807706       0.311681        0       0.355601        1
24356  0        -2.40682e-07   8.89429e-07     0       0.980627        0.992386        -0.321863       0       -0.34602
1.51972         6.15796e-07    6.46694e-08     0       0.93435 0.295544        0.883343        0       1.35395
0.321461        0       8.19944e-07    5.00692e-07     0       0.934515        -0.0778815      -0.914022       0       -
1.37045 -0.00651797     0       9.70836e-08    -1.15852e-06    0       0.999576        0.0970295       -0.343704       0
0.49842         -0.190402       0       6.51619e-07    2.70996e-06     0       0.915234        0.205776        -1.24862
        -1.83032        -0.473393       0       1.30458e-07    -8.41119e-07    0       0.931981        1.10552 -0.69804
        0       -0.890609       -1.73843        0       1.06914e-06     1.1174e-06      0       0.967409        0.435611
0.194127        0       -0.230516       -0.674163       0       4.16478e-07     2.87698e-07     0       0.976479        -
0.688814        0.764915        0       1.04591 1.12735 0       -9.83578e-07    4.32173e-07     0       0.984333        -
.84221 0.814988         0       0.965959        2.85025 0       -5.18379e-07    1.96928e-07     0       0.906819        0
302179 1.82915 0        2.76215 -0.204675       0       3.19897e-06     9.81269e-06     0       0.996656        -0.61435
        -0.836159       0       -1.32643        0.802154        0       -2.30545e-07    -1.47987e-07    0       0.934209
0.974323        0.437114        0       0.519925        1.50828 0       -5.29109e-07    4.66243e-07     0       0.984258
0.566078        1.35715 0       1.94357 1.02404 0       1.1246e-06      1.35932e-06     0       0.970614        0.23711
0.910974        0       -1.32373        -0.474801       0       -3.23689e-07    -1.01109e-06    0       0.938044        -
.279604         -0.391503       0       -0.619979       0.363608        0       -1.70612e-06    3.41089e-06     0       0
952416 -0.596668        -0.0730466      0       -0.188593       0.878029        0       -1.41753e-06    -8.70902e-07    0
.938929         -0.112734       0.0697131       0       0.0886326       0.177078        0       4.48681e-07     -2.05351
e-06   0        0.971832        -0.00193292     -1.97331        0       -2.93643        -0.26138        0       -3.32388
e-07    -3.73322e-07    0       0.959877        0.0804735       0.847544        0       1.27188 -0.00624131     0       -
.04047e-06      -1.33467e-06    0       0.937469        -0.285984       -0.659761       0       -1.01999        0.337177
        -9.1055e-07     -3.99061e-06    0       0.91877 -1.5742 0.56562 0       0.630803        2.41808 0       -3.555e-
7       1.75695e-07     0       0.996498        1.3487  0.297077        0       0.622647        -1.96701        0       7
60378e-07       3.32784e-07     0       0.902448        -0.546642       0.948892        0       1.3387  0.940446        0
1.78151e-06     1.78622e-06     0       0.930226        -0.481898       1.4746  0       2.12959 0.914511        0       -
.92706e-07      9.01879e-07     0       0.94021 0.648947        2.07321 0       3.17174 -0.687964        0       5.69546e
07      8.24728e-07     0       0.987319        0.855521        0.695632        0       1.14963 -1.17981        0       -
.18916e-07      3.85997e-07     0       0.917436        1.49847 0.981511        0       1.6611  -2.  82 0       8.45534e
07      3.88668e-07     0       0.972396        0.293975        0.823717        0       1.26502 -0.327111        0       1
17954e-06       8.68781e-07     0       0.958065        -1.21154        -0.280374       0       -0.579426       1.76516
        -4.72987e-07    -3.65698e-07    0       0.940944        1.03875 -0.732683       0       -0.951089       -1.64372
        -3.44572e-06    -1.17698e-07    0       0.920673        -0.301229       -0.447794       0       -0.706633       0
388247 0        -9.01524e-07   1.6297e-06      0       0.960159        -0.264331       1.44649 0       2.1169  0.587018
        -1.53428e-09    8.13004e-07     0       0.984112        -0.849965       0.857188        0       1.16163 1.37949
        -6.36214e-07    -1.52765e-07    0       0.96942 0.413176        -1.45847        0       -2.1148 -0.810096       0
.4039e-06       -1.49486e-06    0       0.909036        -0.171099       0.222396        0       0.308001        0.284369
        -2.50194e-06    3.8205e-06      0       0.915164        0.120054        -0.848724       0       -1.24678        -
.292291         0       5.83416e-07    -5.00163e-06    0       0.977694        -0.456314       0.528298        0       0
724972 0.749718         0       -4.40223e-07   4.65386e-07     0       0.954395        -0.520306       0.431449        0
.572297         0.831966        0       -1.98128e-06    1.3536e-06      0       0.904609        -0.522152       0.175678
        0.191475        0.800461        0       -6.3756e-08     -2.57146e-07    0       0.953738        0.0843304       -
.767447         0       -1.13063        -0.228252       0       -2.09985e-07    -9.82445e-07    0       0.986978        1
0478   -0.287633        0       -0.287667       -1.59759        0       5.53196e-07     -1.26058e-06    0       0.917521
.07123 -0.865144        0       -1.14383        -1.70978        0       8.03841e-07     -4.34404e-07    0       0.963763
0.100617        -1.54707        0       -2.31543        -0.0574623      0       -6.54034e-07    -2.4263e-06     0       0
96046  -0.526897        -1.51806        0       -2.32935        0.580704        0       -8.29553e-07    -7.58004e-07    0

runtime(GPU): 1.83542 s
```

For 100000 particles:

```
2        0        -1.24612      -1.96155      0        2.62826e-07    -6.36239e-07    0      0.985387      0.36865
-0.471613      0        -0.652367      -0.611689      0      -7.25099e-07    -2.25414e-06    0      0.942247      -
1.35646 0.190947      0      0.102468      2.04391 0      -1.0184e-05    -1.99584e-06    0      0.955911      -
0.293756      0.697505      0      0.998512      0.5305 0      -6.98659e-07    4.66841e-07    0      0.937738
-1.89308      -0.454368      0      -0.929588      2.75596 0      -4.28559e-06    4.78845e-06    0      0.957448
0.46306      0.993403      0      1.41612 0.82204 0      -9.52549e-06    1.22934e-06    0      0.944684      -
0.237459      -0.502794      0      -0.779931      0.285995      0      -2.87911e-06    1.01313e-06    0      0
961578 -1.59731      -0.45003      0      -0.883525      2.31645 0      1.89827e-07    5.87418e-07    0      0
946147 1.10282 -0.735469      0      -0.946656      -1.73943      0      2.50063e-06    -3.21586e-06    0      0
94285  -1.18692      -0.224863      0      -0.493532      1.73597 0      -3.68208e-06    -1.30406e-06    0      0
933612 -1.05056      0.524249      0      0.639369      1.63339 0      -4.50306e-07    3.69276e-06    0      0
959435 -0.164994      0.281398      0      0.39661 0.283186      0      -1.16014e-05    9.17147e-06    0      0
946034 0.222444      0.110923      0      0.194837      -0.316131      0      1.40803e-05    -1.10315e-06    0
987787      -0.00395217      0.431832      0      0.642014      0.0637093      0      -4.26799e-06    -3.2633e
06     0      0.98891 0.263704      -0.90211      0      -1.30697      -0.513194      0      0.000153394      -
0.000188784      0      0.962415      -0.557045      -0.854635      0      -1.34625      0.714405      0      3
37505e-08      1.98551e-06    0      0.978292      1.06985 -0.494852      0      -0.593044      -1.65815      0
7.19733e-06    7.38778e-09      0      0.96177 0.881793      -0.289611      0      -0.312841      -1.35085      0
1.85021e-06    -1.55488e-06    0      0.97283 0.729499      -2.74859      0      -3.99207      -1.45353      0
-6.70756e-06    9.2477e-06      0      0.904868      0.166116      -0.384518      0      -0.549899      -0.29866
4      0      -2.14774e-05    1.03605e-05      0      0.910092      0.534159      0.0848382      0      0.197767
-0.783439      0      2.09061e-06    -2.71869e-06    0      0.987256      2.63349 -0.473568      0      -0.35197
9      -3.98192      0      1.37183e-06    -4.42766e-07    0      0.977189      -0.503724      -0.0425502      0
-0.130769      0.743818      0      -1.63988e-06    8.971e-06      0      0.940155      1.50284 -1.91318      0
2.64546      -2.49235      0      1.13723e-05    -1.47965e-05      0      0.927299      1.22763 -0.604736      0
-0.735418      -1.90763      0      2.77698e-06    -9.02785e-07    0      0.956834      -1.15789      0.300245
9      0.291716      1.7631 0      0.000435481      9.98262e-05      0      0.970255      -0.747851      -0.36978
9      0      -0.650375      1.06324 0      -9.62659e-07    -3.60987e-06    0      0.99147 2.4004 -0.406015      0
-0.282678      -3.62604      0      1.47291e-06    -2.18432e-07    0      0.918493      -0.347198      -1.48241
0      -2.25224      0.318095      0      -1.3553e-06    -3.3814e-06    0      0.920587      -1.16712      0
0455484      0      -0.0885225      1.74272 0      -4.96962e-06    -2.76257e-07    0      0.932195      1.61041
1.33163      0      -1.76573      -2.57453      0      1.5324e-06    -1.18027e-06    0      0.937825      -
1.51917 -0.738298      0      -1.30199      2.16158 0      -3.22233e-06    1.82032e-08    0      0.966535      1
68721 -0.570215      0      -0.622507      -2.58684      0      1.21769e-06    -1.53801e-06    0      0.925782
0.906767      -1.43743      0      -2.01739      -1.54172      0      1.98662e-07    -1.00451e-06    0      0
927807 1.27875 0.693311      0      1.20285 -1.80986      0      2.45341e-06    -8.14903e-07    0      0.931372
0.790947      0.17315 0      0.363558      -1.1537 0      4.74017e-06    -4.47051e-07    0      0.917579      0
214612 -0.553134      0      -0.794295      -0.393405      0      2.44892e-06    -4.22148e-06    0      0.977149
0.897773      -0.343029      0      -0.390183      -1.38178      0      2.93178e-06    3.19255e-06    0      0
91898  -0.874971      1.16151 0      1.6111 1.45745 0      3.51045e-07    -1.71712e-06    0      0.925016      0
0.552648      0.878614      0      1.23332 0.939972      0      -3.88975e-06    -7.09489e-07    0      0.903771
0.0190993      -0.134734      0      -0.19792      -0.0464614      0      8.69244e-07    3.99693e-06    0      0
971743 -0.248379      1.07587 0      1.56757 0.51365 0      -3.11626e-06    5.68786e-07    0      0.986772      0
909613 -0.77724      0      -1.03468      -1.45754      0      4.83375e-07    -2.56047e-06    0      0.905289
-0.192101      0.402691      0      0.573457      0.339763      0      6.41148e-07    3.90335e-06    0      0
961449 1.56582 -0.0688194      0      0.107288      -2.33908      0      2.24283e-06    -6.7202e-07    0      0
968002 1.03613 -0.673866      0      -0.863923      -1.63196      0      -3.36273e-06    7.82452e-07    0      0
990977 -1.24448      1.00168 0      1.32379 1.98587 0      -1.27581e-06    2.44621e-06    0
runtime(GPU): 15.0943 s
```