

# RAMSES test suite results

rt3504

May 31, 2023

Commit hash: [ebcb67](#)

Test run summary using 4 processor(s)

|    | Test name                          | Run time | Total time | Status |
|----|------------------------------------|----------|------------|--------|
| 1  | <a href="#">hydro/barotrop</a>     | 0h0m2s   | 0h0m35s    | passed |
| 2  | <a href="#">hydro/cooling-frig</a> | 0h0m41s  | 0h1m34s    | passed |
| 3  | <a href="#">hydro/implosion</a>    | 0h0m34s  | 0h1m8s     | passed |
| 4  | <a href="#">hydro/isothermal</a>   | 0h0m4s   | 0h0m36s    | passed |
| 5  | <a href="#">hydro/sod-tube</a>     | 0h0m0s   | 0h0m32s    | passed |
| 6  | <a href="#">mhd/imhd-tube</a>      | 0h0m2s   | 0h0m35s    | passed |
| 7  | <a href="#">mhd/orszag-tang</a>    | 0h0m52s  | 0h1m28s    | passed |
| 8  | <a href="#">rt/stromgren2d</a>     | 0h0m14s  | 0h0m55s    | passed |
| 9  | <a href="#">turb/driving</a>       | 0h0m45s  | 0h1m37s    | passed |
| 10 | <a href="#">tracer/sedov</a>       | 0h0m46s  | 0h1m22s    | passed |

Total run time (including compilations): 0h10m27s



Figure 1: hydro/barotrop test

Table 1: barotrop error summary

| Variable   | This run               | Reference              | Error                  | Tolerance              |
|------------|------------------------|------------------------|------------------------|------------------------|
| boxlen     | 1.0000000000000000e+00 | 1.0000000000000000e+00 | 0.0000000000000000e+00 | 2.999999999999998e-13  |
| density    | 1.6794314781800492e+03 | 1.6794314781792584e+03 | 4.7087699228366635e-13 | 2.0000000000000000e-12 |
| dx         | 1.0000000000000000e+00 | 1.0000000000000000e+00 | 0.0000000000000000e+00 | 2.999999999999998e-13  |
| level      | 8.3320000000000000e+03 | 8.3320000000000000e+03 | 0.0000000000000000e+00 | 2.999999999999998e-13  |
| ncells     | 7.8400000000000000e+02 | 7.8400000000000000e+02 | 0.0000000000000000e+00 | 2.999999999999998e-13  |
| pressure   | 6.0188902556779146e+02 | 6.0188902556693643e+02 | 1.4205919533071547e-12 | 2.0000000000000000e-12 |
| time       | 4.9053079624299697e-04 | 4.9053079624279097e-04 | 4.1995000996896793e-13 | 2.0000000000000000e-12 |
| unit d     | 0.0000000000000000e+00 | 0.0000000000000000e+00 | 0.0000000000000000e+00 | 2.999999999999998e-13  |
| unit l     | 3.0857000000000000e+18 | 3.0857000000000000e+18 | 0.0000000000000000e+00 | 2.999999999999998e-13  |
| unit t     | 3.1556926000000000e+13 | 3.1556926000000000e+13 | 0.0000000000000000e+00 | 2.999999999999998e-13  |
| velocity x | 1.0539070571590826e+04 | 1.0539070571585386e+04 | 5.1623122447573017e-13 | 2.0000000000000000e-12 |
| x          | 3.9200000000000000e+02 | 3.9200000000000000e+02 | 0.0000000000000000e+00 | 2.999999999999998e-13  |
| y          | 0.0000000000000000e+00 | 0.0000000000000000e+00 | 0.0000000000000000e+00 | 2.999999999999998e-13  |
| z          | 0.0000000000000000e+00 | 0.0000000000000000e+00 | 0.0000000000000000e+00 | 2.999999999999998e-13  |



Figure 2: hydro/cooling-frig test

Table 2: cooling-frig error summary

| Variable   | This run                | Reference               | Error                  | Tolerance             |
|------------|-------------------------|-------------------------|------------------------|-----------------------|
| boxlen     | 5.000000000000000e+02   | 5.000000000000000e+02   | 0.000000000000000e+00  | 2.999999999999998e-13 |
| density    | -1.4250982321254784e+04 | -1.4250982321254638e+04 | 1.0211166430726244e-14 | 2.999999999999998e-13 |
| dx         | 5.120000000000000e+05   | 5.120000000000000e+05   | 0.000000000000000e+00  | 2.999999999999998e-13 |
| level      | 1.638400000000000e+05   | 1.638400000000000e+05   | 0.000000000000000e+00  | 2.999999999999998e-13 |
| ncells     | 3.276800000000000e+04   | 3.276800000000000e+04   | 0.000000000000000e+00  | 2.999999999999998e-13 |
| pressure   | 1.5788229607209752e+05  | 1.5788229607209750e+05  | 1.8433878389660194e-16 | 2.999999999999998e-13 |
| time       | 6.2181777872549604e-01  | 6.2181777872549504e-01  | 1.6069027878402681e-15 | 2.999999999999998e-13 |
| unit d     | 2.324743400000000e-24   | 2.324743400000000e-24   | 0.000000000000000e+00  | 2.999999999999998e-13 |
| unit l     | 3.085700000000000e+18   | 3.085700000000000e+18   | 0.000000000000000e+00  | 2.999999999999998e-13 |
| unit t     | 2.539507900000000e+15   | 2.539507900000000e+15   | 0.000000000000000e+00  | 2.999999999999998e-13 |
| velocity x | 2.0560963580686219e+07  | 2.0560963580686357e+07  | 6.7037588244437025e-15 | 2.999999999999998e-13 |
| velocity y | 1.7589792977584463e+07  | 1.7589792977584992e+07  | 3.0073760564192616e-14 | 2.999999999999998e-13 |
| velocity z | 1.4009448254150467e+07  | 1.4009448254150048e+07  | 2.9915179454181280e-14 | 2.999999999999998e-13 |
| x          | 8.192000000000000e+06   | 8.192000000000000e+06   | 0.000000000000000e+00  | 2.999999999999998e-13 |
| y          | 8.192000000000000e+06   | 8.192000000000000e+06   | 0.000000000000000e+00  | 2.999999999999998e-13 |
| z          | 8.192000000000000e+06   | 8.192000000000000e+06   | 0.000000000000000e+00  | 2.999999999999998e-13 |



Figure 3: hydro/implosion test

Table 3: implosion error summary

| Variable   | This run                | Reference               | Error                  | Tolerance             |
|------------|-------------------------|-------------------------|------------------------|-----------------------|
| boxlen     | 1.0000000000000000e+00  | 1.0000000000000000e+00  | 0.0000000000000000e+00 | 2.999999999999998e-13 |
| density    | -3.2489384827987228e+03 | -3.2489384827987228e+03 | 0.0000000000000000e+00 | 2.999999999999998e-13 |
| dx         | 9.7671875000000000e+01  | 9.7671875000000000e+01  | 0.0000000000000000e+00 | 2.999999999999998e-13 |
| level      | 1.1594500000000000e+05  | 1.1594500000000000e+05  | 0.0000000000000000e+00 | 2.999999999999998e-13 |
| ncells     | 1.5349000000000000e+04  | 1.5349000000000000e+04  | 0.0000000000000000e+00 | 2.999999999999998e-13 |
| pressure   | -9.8425832051307543e+02 | -9.8425832051307543e+02 | 0.0000000000000000e+00 | 2.999999999999998e-13 |
| time       | 5.0041662782999197e+00  | 5.0041662782999197e+00  | 0.0000000000000000e+00 | 2.999999999999998e-13 |
| unit d     | 1.0000000000000000e+00  | 1.0000000000000000e+00  | 0.0000000000000000e+00 | 2.999999999999998e-13 |
| unit l     | 1.0000000000000000e+00  | 1.0000000000000000e+00  | 0.0000000000000000e+00 | 2.999999999999998e-13 |
| unit t     | 1.0000000000000000e+00  | 1.0000000000000000e+00  | 0.0000000000000000e+00 | 2.999999999999998e-13 |
| velocity x | 8.0459072052113027e+02  | 8.0459072052113027e+02  | 0.0000000000000000e+00 | 2.999999999999998e-13 |
| velocity y | 8.0459072052125236e+02  | 8.0459072052125236e+02  | 0.0000000000000000e+00 | 2.999999999999998e-13 |
| x          | 4.9655703125000000e+03  | 4.9655703125000000e+03  | 0.0000000000000000e+00 | 2.999999999999998e-13 |
| y          | 4.9655703125000000e+03  | 4.9655703125000000e+03  | 0.0000000000000000e+00 | 2.999999999999998e-13 |
| z          | 0.0000000000000000e+00  | 0.0000000000000000e+00  | 0.0000000000000000e+00 | 2.999999999999998e-13 |



Figure 4: hydro/isothermal test

Table 4: isothermal error summary

| Variable   | This run               | Reference              | Error                  | Tolerance             |
|------------|------------------------|------------------------|------------------------|-----------------------|
| boxlen     | 1.0000000000000000e+00 | 1.0000000000000000e+00 | 0.0000000000000000e+00 | 2.999999999999998e-13 |
| density    | 1.6311954187712895e+03 | 1.6311954187664121e+03 | 2.9900725908250087e-12 | 4.999999999999997e-12 |
| dx         | 1.0000000000000000e+00 | 1.0000000000000000e+00 | 0.0000000000000000e+00 | 2.999999999999998e-13 |
| level      | 8.4900000000000000e+03 | 8.4900000000000000e+03 | 0.0000000000000000e+00 | 2.999999999999998e-13 |
| ncells     | 7.9400000000000000e+02 | 7.9400000000000000e+02 | 0.0000000000000000e+00 | 2.999999999999998e-13 |
| pressure   | 4.9146152387489883e+02 | 4.9146152387002013e+02 | 9.9269217906402560e-12 | 9.999999999999994e-12 |
| time       | 4.9054716112689604e-04 | 4.9054716112737103e-04 | 9.6828400897223431e-13 | 2.000000000000000e-12 |
| unit d     | 0.0000000000000000e+00 | 0.0000000000000000e+00 | 0.0000000000000000e+00 | 2.999999999999998e-13 |
| unit l     | 3.0857000000000000e+18 | 3.0857000000000000e+18 | 0.0000000000000000e+00 | 2.999999999999998e-13 |
| unit t     | 3.1556926000000000e+13 | 3.1556926000000000e+13 | 0.0000000000000000e+00 | 2.999999999999998e-13 |
| velocity x | 1.0798863269643682e+04 | 1.0798863269655247e+04 | 1.0709585202597123e-12 | 2.000000000000000e-12 |
| x          | 3.9700000000000000e+02 | 3.9700000000000000e+02 | 0.0000000000000000e+00 | 2.999999999999998e-13 |
| y          | 0.0000000000000000e+00 | 0.0000000000000000e+00 | 0.0000000000000000e+00 | 2.999999999999998e-13 |
| z          | 0.0000000000000000e+00 | 0.0000000000000000e+00 | 0.0000000000000000e+00 | 2.999999999999998e-13 |



Figure 5: hydro/sod-tube test

Table 5: sod-tube error summary

| Variable   | This run                | Reference               | Error                  | Tolerance             |
|------------|-------------------------|-------------------------|------------------------|-----------------------|
| boxlen     | 1.0000000000000000e+00  | 1.0000000000000000e+00  | 0.0000000000000000e+00 | 2.999999999999998e-13 |
| density    | -6.2283208883831371e+01 | -6.2283208883831371e+01 | 0.0000000000000000e+00 | 2.999999999999998e-13 |
| dx         | 1.0000000000000000e+00  | 1.0000000000000000e+00  | 0.0000000000000000e+00 | 2.999999999999998e-13 |
| level      | 1.1010000000000000e+03  | 1.1010000000000000e+03  | 0.0000000000000000e+00 | 2.999999999999998e-13 |
| ncells     | 1.4200000000000000e+02  | 1.4200000000000000e+02  | 0.0000000000000000e+00 | 2.999999999999998e-13 |
| pressure   | -6.8864503408245511e+01 | -6.8864503408245525e+01 | 2.0635964846731855e-16 | 2.999999999999998e-13 |
| time       | 2.4504723587196500e-01  | 2.4504723587196500e-01  | 0.0000000000000000e+00 | 2.999999999999998e-13 |
| unit d     | 1.0000000000000000e+00  | 1.0000000000000000e+00  | 0.0000000000000000e+00 | 2.999999999999998e-13 |
| unit l     | 1.0000000000000000e+00  | 1.0000000000000000e+00  | 0.0000000000000000e+00 | 2.999999999999998e-13 |
| unit t     | 1.0000000000000000e+00  | 1.0000000000000000e+00  | 0.0000000000000000e+00 | 2.999999999999998e-13 |
| velocity x | 8.7630269431102121e+01  | 8.7630269431102136e+01  | 1.6216833301391432e-16 | 2.999999999999998e-13 |
| x          | 9.0823242187500000e+01  | 9.0823242187500000e+01  | 0.0000000000000000e+00 | 2.999999999999998e-13 |
| y          | 0.0000000000000000e+00  | 0.0000000000000000e+00  | 0.0000000000000000e+00 | 2.999999999999998e-13 |
| z          | 0.0000000000000000e+00  | 0.0000000000000000e+00  | 0.0000000000000000e+00 | 2.999999999999998e-13 |



Figure 6: mhd/imhd-tube test

Table 6: imhd-tube error summary

| Variable   | This run                | Reference               | Error                  | Tolerance             |
|------------|-------------------------|-------------------------|------------------------|-----------------------|
| B x left   | 4.370000000000000e+02   | 4.370000000000000e+02   | 0.000000000000000e+00  | 2.999999999999998e-13 |
| B x right  | 4.370000000000000e+02   | 4.370000000000000e+02   | 0.000000000000000e+00  | 2.999999999999998e-13 |
| B y left   | 2.3391683489759890e+02  | 2.3391683489759890e+02  | 0.000000000000000e+00  | 2.999999999999998e-13 |
| B y right  | 2.3391683489759890e+02  | 2.3391683489759890e+02  | 0.000000000000000e+00  | 2.999999999999998e-13 |
| B z left   | 4.5872245532670718e+01  | 4.5872245532670732e+01  | 3.0979200059174945e-16 | 2.999999999999998e-13 |
| B z right  | 4.5872245532670718e+01  | 4.5872245532670732e+01  | 3.0979200059174945e-16 | 2.999999999999998e-13 |
| boxlen     | 3.500000000000000e+00   | 3.500000000000000e+00   | 0.000000000000000e+00  | 2.999999999999998e-13 |
| density    | -1.4066192896319757e+02 | -1.4066192896319757e+02 | 0.000000000000000e+00  | 2.999999999999998e-13 |
| dx         | 3.500000000000000e+00   | 3.500000000000000e+00   | 0.000000000000000e+00  | 2.999999999999998e-13 |
| level      | 4.906000000000000e+03   | 4.906000000000000e+03   | 0.000000000000000e+00  | 2.999999999999998e-13 |
| ncells     | 4.370000000000000e+02   | 4.370000000000000e+02   | 0.000000000000000e+00  | 2.999999999999998e-13 |
| pressure   | -1.2848475642042584e+02 | -1.2848475642042584e+02 | 0.000000000000000e+00  | 2.999999999999998e-13 |
| time       | 4.0066021201843099e-01  | 4.0066021201843099e-01  | 0.000000000000000e+00  | 2.999999999999998e-13 |
| unit d     | 1.000000000000000e+00   | 1.000000000000000e+00   | 0.000000000000000e+00  | 2.999999999999998e-13 |
| unit l     | 1.000000000000000e+00   | 1.000000000000000e+00   | 0.000000000000000e+00  | 2.999999999999998e-13 |
| unit t     | 1.000000000000000e+00   | 1.000000000000000e+00   | 0.000000000000000e+00  | 2.999999999999998e-13 |
| velocity x | 1.9389631695548837e+02  | 1.9389631695548837e+02  | 0.000000000000000e+00  | 2.999999999999998e-13 |
| velocity y | 4.0503914358611451e+02  | 4.0503914358611451e+02  | 0.000000000000000e+00  | 2.999999999999998e-13 |
| velocity z | 4.4181525014765903e+01  | 4.4181525014765903e+01  | 0.000000000000000e+00  | 2.999999999999998e-13 |
| x          | 7.1933459472656250e+02  | 7.1933459472656250e+02  | 0.000000000000000e+00  | 2.999999999999998e-13 |
| y          | 0.000000000000000e+00   | 0.000000000000000e+00   | 0.000000000000000e+00  | 2.999999999999998e-13 |
| z          | 0.000000000000000e+00   | 0.000000000000000e+00   | 0.000000000000000e+00  | 2.999999999999998e-13 |



Figure 7: mhd/orzag-tang test

Table 7: orzag-tang error summary

| Variable   | This run                | Reference               | Error                  | Tolerance             |
|------------|-------------------------|-------------------------|------------------------|-----------------------|
| B x left   | 2.2678255644469846e+04  | 2.2678255644469846e+04  | 0.0000000000000000e+00 | 2.999999999999998e-13 |
| B x right  | 2.2678255644469846e+04  | 2.2678255644469846e+04  | 0.0000000000000000e+00 | 2.999999999999998e-13 |
| B y left   | 2.4171115525910489e+04  | 2.4171115525910489e+04  | 0.0000000000000000e+00 | 2.999999999999998e-13 |
| B y right  | 2.4171115525910489e+04  | 2.4171115525910489e+04  | 0.0000000000000000e+00 | 2.999999999999998e-13 |
| B z left   | 0.0000000000000000e+00  | 0.0000000000000000e+00  | 0.0000000000000000e+00 | 2.999999999999998e-13 |
| B z right  | 0.0000000000000000e+00  | 0.0000000000000000e+00  | 0.0000000000000000e+00 | 2.999999999999998e-13 |
| boxlen     | 1.0000000000000000e+00  | 1.0000000000000000e+00  | 0.0000000000000000e+00 | 2.999999999999998e-13 |
| density    | -6.8695267744666649e+04 | -6.8695267744666649e+04 | 0.0000000000000000e+00 | 2.999999999999998e-13 |
| dx         | 2.8000000000000000e+02  | 2.8000000000000000e+02  | 0.0000000000000000e+00 | 2.999999999999998e-13 |
| level      | 8.6243200000000000e+05  | 8.6243200000000000e+05  | 0.0000000000000000e+00 | 2.999999999999998e-13 |
| ncells     | 1.0006600000000000e+05  | 1.0006600000000000e+05  | 0.0000000000000000e+00 | 2.999999999999998e-13 |
| pressure   | -8.8280494263311819e+04 | -8.8280494263311819e+04 | 0.0000000000000000e+00 | 2.999999999999998e-13 |
| time       | 5.0191436955161295e-01  | 5.0191436955161295e-01  | 0.0000000000000000e+00 | 2.999999999999998e-13 |
| unit d     | 1.0000000000000000e+00  | 1.0000000000000000e+00  | 0.0000000000000000e+00 | 2.999999999999998e-13 |
| unit l     | 1.0000000000000000e+00  | 1.0000000000000000e+00  | 0.0000000000000000e+00 | 2.999999999999998e-13 |
| unit t     | 1.0000000000000000e+00  | 1.0000000000000000e+00  | 0.0000000000000000e+00 | 2.999999999999998e-13 |
| velocity x | 3.8430367312560731e+04  | 3.8430367312560731e+04  | 0.0000000000000000e+00 | 2.999999999999998e-13 |
| velocity y | 3.6141593808548649e+04  | 3.6141593808548649e+04  | 0.0000000000000000e+00 | 2.999999999999998e-13 |
| velocity z | 0.0000000000000000e+00  | 0.0000000000000000e+00  | 0.0000000000000000e+00 | 2.999999999999998e-13 |
| x          | 5.0033000000000000e+04  | 5.0033000000000000e+04  | 0.0000000000000000e+00 | 2.999999999999998e-13 |
| y          | 5.0033000000000000e+04  | 5.0033000000000000e+04  | 0.0000000000000000e+00 | 2.999999999999998e-13 |
| z          | 0.0000000000000000e+00  | 0.0000000000000000e+00  | 0.0000000000000000e+00 | 2.999999999999998e-13 |





Figure 8: rt/stromgren2d test

Table 8: stromgren2d error summary

| Variable    | This run                | Reference               | Error                  | Tolerance              |
|-------------|-------------------------|-------------------------|------------------------|------------------------|
| boxlen      | 1.0000000000000000e+00  | 1.0000000000000000e+00  | 0.0000000000000000e+00 | 3.0000000000000001e-06 |
| density     | -1.6452782335621334e+04 | -1.6452782335617510e+04 | 2.3239326019503224e-13 | 3.0000000000000001e-06 |
| dx          | 1.2800000000000000e+02  | 1.2800000000000000e+02  | 0.0000000000000000e+00 | 3.0000000000000001e-06 |
| level       | 1.1468800000000000e+05  | 1.1468800000000000e+05  | 0.0000000000000000e+00 | 3.0000000000000001e-06 |
| metallicity | 0.0000000000000000e+00  | 0.0000000000000000e+00  | 0.0000000000000000e+00 | 3.0000000000000001e-06 |
| ncells      | 1.6384000000000000e+04  | 1.6384000000000000e+04  | 0.0000000000000000e+00 | 3.0000000000000001e-06 |
| pressure    | -8.1662884923335063e+04 | -8.1662884923947786e+04 | 7.5030773549187932e-12 | 3.0000000000000001e-06 |
| scalar 01   | 4.3828664073005466e+03  | 4.3828664052645590e+03  | 4.6453333849868201e-10 | 3.0000000000000001e-06 |
| scalar 02   | 0.0000000000000000e+00  | 0.0000000000000000e+00  | 0.0000000000000000e+00 | 3.0000000000000001e-06 |
| scalar 03   | 0.0000000000000000e+00  | 0.0000000000000000e+00  | 0.0000000000000000e+00 | 3.0000000000000001e-06 |
| time        | 1.5003966839451200e+01  | 1.5003966839451200e+01  | 0.0000000000000000e+00 | 3.0000000000000001e-06 |
| unit d      | 0.0000000000000000e+00  | 0.0000000000000000e+00  | 0.0000000000000000e+00 | 3.0000000000000001e-06 |
| unit l      | 3.0900000000000000e+21  | 3.0900000000000000e+21  | 0.0000000000000000e+00 | 3.0000000000000001e-06 |
| unit t      | 3.1556926000000000e+13  | 3.1556926000000000e+13  | 0.0000000000000000e+00 | 3.0000000000000001e-06 |
| velocity x  | 8.7948060487332427e+00  | 8.7948060465423854e+00  | 2.4910808285962630e-10 | 3.0000000000000001e-06 |
| velocity y  | 8.7948060487332409e+00  | 8.7948060465423854e+00  | 2.4910788088168276e-10 | 3.0000000000000001e-06 |
| x           | 8.1920000000000000e+03  | 8.1920000000000000e+03  | 0.0000000000000000e+00 | 3.0000000000000001e-06 |
| y           | 8.1920000000000000e+03  | 8.1920000000000000e+03  | 0.0000000000000000e+00 | 3.0000000000000001e-06 |
| z           | 0.0000000000000000e+00  | 0.0000000000000000e+00  | 0.0000000000000000e+00 | 3.0000000000000001e-06 |



Figure 9: turb/driving test

Table 9: driving error summary

| Variable   | This run                | Reference               | Error                 | Tolerance             |
|------------|-------------------------|-------------------------|-----------------------|-----------------------|
| boxlen     | 4.000000000000000e+00   | 4.000000000000000e+00   | 0.000000000000000e+00 | 2.999999999999998e-13 |
| density    | -1.5970192503110823e+05 | -1.5970192503110823e+05 | 0.000000000000000e+00 | 2.999999999999998e-13 |
| dx         | 1.638400000000000e+04   | 1.638400000000000e+04   | 0.000000000000000e+00 | 2.999999999999998e-13 |
| level      | 1.572864000000000e+06   | 1.572864000000000e+06   | 0.000000000000000e+00 | 2.999999999999998e-13 |
| ncells     | 2.621440000000000e+05   | 2.621440000000000e+05   | 0.000000000000000e+00 | 2.999999999999998e-13 |
| pressure   | -5.3599210405342397e+05 | -5.3599210405342397e+05 | 0.000000000000000e+00 | 2.999999999999998e-13 |
| time       | 2.5147260806143501e-01  | 2.5147260806143501e-01  | 0.000000000000000e+00 | 2.999999999999998e-13 |
| unit d     | 1.5049295743500001e-20  | 1.5049295743500001e-20  | 0.000000000000000e+00 | 2.999999999999998e-13 |
| unit l     | 3.085700000000000e+18   | 3.085700000000000e+18   | 0.000000000000000e+00 | 2.999999999999998e-13 |
| unit t     | 3.155692600000000e+13   | 3.155692600000000e+13   | 0.000000000000000e+00 | 2.999999999999998e-13 |
| velocity x | 2.2878502213449072e+05  | 2.2878502213449072e+05  | 0.000000000000000e+00 | 2.999999999999998e-13 |
| velocity y | 2.2205591253462457e+05  | 2.2205591253462457e+05  | 0.000000000000000e+00 | 2.999999999999998e-13 |
| velocity z | 2.1700854906616427e+05  | 2.1700854906616427e+05  | 0.000000000000000e+00 | 2.999999999999998e-13 |
| x          | 5.242880000000000e+05   | 5.242880000000000e+05   | 0.000000000000000e+00 | 2.999999999999998e-13 |
| y          | 5.242880000000000e+05   | 5.242880000000000e+05   | 0.000000000000000e+00 | 2.999999999999998e-13 |
| z          | 5.242880000000000e+05   | 5.242880000000000e+05   | 0.000000000000000e+00 | 2.999999999999998e-13 |



Figure 10: tracer/sedov test

Table 10: sedov error summary

| Variable   | This run               | Reference              | Error                  | Tolerance              |
|------------|------------------------|------------------------|------------------------|------------------------|
| family     | 0.0000000000000000e+00 | 0.0000000000000000e+00 | 0.0000000000000000e+00 | 3.9999280019439422e-03 |
| levelp     | 1.2500450000000000e+06 | 1.2499300000000000e+06 | 9.2005152288528153e-05 | 3.9999280019439422e-03 |
| mass       | 2.5000900000000009e-01 | 2.4998600000000015e-01 | 9.2005152288287027e-05 | 3.9999280019439422e-03 |
| position x | 6.3310902343750000e+04 | 6.3286064453125000e+04 | 3.9247014077478366e-04 | 3.9999280019439422e-03 |
| position y | 6.3304500000000000e+04 | 6.3278091796875000e+04 | 4.1733564295477337e-04 | 3.9999280019439422e-03 |
| tag        | 0.0000000000000000e+00 | 0.0000000000000000e+00 | 0.0000000000000000e+00 | 3.9999280019439422e-03 |