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# pyhpc rocket

Intel Core i9-11900K testing with a ASUS ROG MAXIMUS XIII HERO (1007 BIOS) and AMD Radeon VII 16GB on Clear Linux OS 35150 via the Phoronix Test Suite.

**Automated Executive Summary**

*1 had the most wins, coming in first place for 85% of the tests.*

*Based on the geometric mean of all complete results, the fastest (3) was 1.008x the speed of the slowest (2). 1 was 0.999x the speed of 3 and 2 was 0.993x the speed of 1.*

*The results with the greatest spread from best to worst included:*

*PyHPC Benchmarks (Device: CPU - Backend: Numpy - Project Size: 262144 - Benchmark: Equation of State) at 1.255x*
*PyHPC Benchmarks (Device: CPU - Backend: Numpy - Project Size: 65536 - Benchmark: Isoneutral Mixing) at 1.045x*
*PyHPC Benchmarks (Device: CPU - Backend: Numba - Project Size: 262144 - Benchmark: Isoneutral Mixing) at 1.044x*
*PyHPC Benchmarks (Device: CPU - Backend: Numba - Project Size: 4194304 - Benchmark: Equation of State) at 1.024x*
*PyHPC Benchmarks (Device: CPU - Backend: Numpy - Project Size: 262144 - Benchmark: Isoneutral Mixing) at 1.022x*
*PyHPC Benchmarks (Device: CPU - Backend: Numpy - Project Size: 1048576 - Benchmark: Isoneutral Mixing) at 1.005x*
*PyHPC Benchmarks (Device: CPU - Backend: Numpy - Project Size: 1048576 - Benchmark: Equation of State) at*

*1.004x*
*PyHPC Benchmarks (Device: CPU - Backend: Numba - Project Size: 4194304 - Benchmark: Isoneutral Mixing) at 1.003x*
*PyHPC Benchmarks (Device: CPU - Backend: Numpy - Project Size: 4194304 - Benchmark: Equation of State) at 1.002x*
*PyHPC Benchmarks (Device: CPU - Backend: Numpy - Project Size: 4194304 - Benchmark: Isoneutral Mixing) at 1.002x.*

# Test Systems:

## 1

## 2

## 3

Processor: Intel Core i9-11900K @ 5.10GHz (8 Cores / 16 Threads), Motherboard: ASUS ROG MAXIMUS XIII HERO (1007 BIOS), Chipset: Intel Device 43ef, Memory: 32GB, Disk: 2000GB Corsair Force MP600 + 257GB Flash Drive, Graphics: AMD Radeon VII 16GB (1801/1000MHz), Audio: Intel Device 43c8, Monitor: ASUS MG28U, Network: 2 x Intel + Intel Device 2725

OS: Clear Linux OS 35150, Kernel: 5.14.13-1083.native (x86_64), Desktop: GNOME Shell 41.0, Display Server: X Server 1.20.11, OpenGL: 4.6 Mesa 21.2.4 (LLVM 11.1.0), Vulkan: 1.2.182, Compiler: GCC 11.2.1 20211015 releases/gcc-11.2.0-353-g6a936be4ad + Clang 11.1.0 + LLVM 11.1.0, File-System: ext4, Screen Resolution: 3840x2160

Kernel Notes: Transparent Huge Pages: always
Environment Notes: FFLAGS="-g -O3 -feliminate-unused-debug-types -pipe -Wall -Wp,-D_FORTIFY_SOURCE=2 -fexceptions -m64 -fasynchronous-unwind-tables -Wp,-D_REENTRANT -ftree-loop-distribute-patterns -Wl,-z -Wl,now -Wl,-z -Wl,relro -malign-data=abi -fno-semantic-interposition -ftree-vectorize -ftree-loop-vectorize -Wl,--enable-new-dtags" CXXFLAGS="-g -O3 -feliminate-unused-debug-types -pipe -Wall -Wp,-D_FORTIFY_SOURCE=2 -fexceptions -Wformat -Wformat-security -m64 -fasynchronous-unwind-tables -Wp,-D_REENTRANT -ftree-loop-distribute-patterns -Wl,-z -Wl,now -Wl,-z -Wl,relro -fno-semantic-interposition -ffat-lto-objects -fno-trapping-math -Wl,-sort-common -Wl,--enable-new-dtags -mtune=skylake -fvisibility-inlines-hidden -Wl,--enable-new-dtags" MESA_GLSL_CACHE_DISABLE=0 FCFLAGS="-g -O3 -feliminate-unused-debug-types -pipe -Wall -Wp,-D_FORTIFY_SOURCE=2 -fexceptions -m64 -fasynchronous-unwind-tables -Wp,-D_REENTRANT -ftree-loop-distribute-patterns -Wl,-z -Wl,now -Wl,-z -Wl,relro -malign-data=abi -fno-semantic-interposition -ftree-vectorize -ftree-loop-vectorize -Wl,-sort-common -Wl,--enable-new-dtags" CFLAGS="-g -O3 -feliminate-unused-debug-types -pipe -Wall -Wp,-D_FORTIFY_SOURCE=2 -fexceptions -Wformat -Wformat-security -m64 -fasynchronous-unwind-tables -Wp,-D_REENTRANT -ftree-loop-distribute-patterns -Wl,-z -Wl,now -Wl,-z -Wl,relro -fno-semantic-interposition -ffat-lto-objects -fno-trapping-math -Wl,-sort-common -Wl,--enable-new-dtags -mtune=skylake" THEANO_FLAGS="floatX=float32,openmp=true,gcc.cxxflags="-ftree-vectorize -mavx""
Processor Notes: Scaling Governor: intel_pstate performance - CPU Microcode: 0x40
Python Notes: Python 3.9.7
Security Notes: itlb_multihit: Not affected + l1tf: Not affected + mds: Not affected + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of usercopy/swapgs barriers and __user pointer sanitization + spectre_v2: Mitigation of Enhanced IBRS IBPB: conditional RSB filling + srbds: Not affected + tsx_async_abort: Not affected

| | 1 | 2 | 3 |
|---|---|---|---|

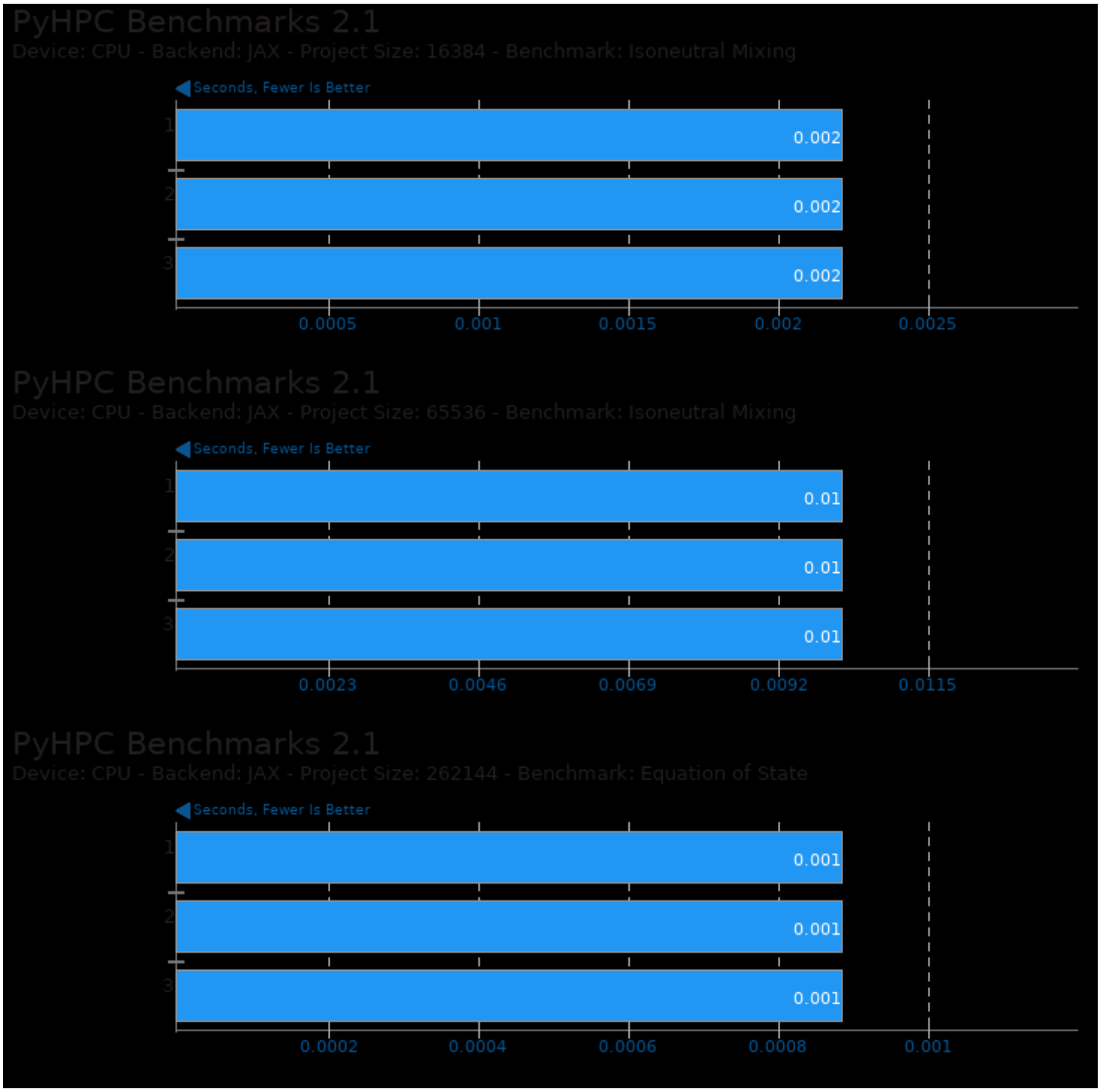
# pyhpc rocket

| | | | |
|---|---|---|---|
| PyHPC Benchmarks - CPU - JAX - 16384 - Isoneutral Mixing (sec) | 0.002 | 0.002 | 0.002 |
| PyHPC Benchmarks - CPU - JAX - 65536 - Isoneutral Mixing (sec) | 0.01 | 0.01 | 0.01 |
| PyHPC Benchmarks - CPU - JAX - 262144 - Equation of State (sec) | 0.001 | 0.001 | 0.001 |
| PyHPC Benchmarks - CPU - JAX - 262144 - Isoneutral Mixing (sec) | 0.034 | 0.034 | 0.034 |
| PyHPC Benchmarks - CPU - JAX - 1048576 - Equation of State (sec) | 0.008 | 0.008 | 0.008 |
| PyHPC Benchmarks - CPU - JAX - 1048576 - Isoneutral Mixing (sec) | 0.141 | 0.141 | 0.141 |
| PyHPC Benchmarks - CPU - JAX - 4194304 - Equation of State (sec) | 0.032 | 0.032 | 0.032 |
| PyHPC Benchmarks - CPU - JAX - 4194304 - Isoneutral Mixing (sec) | 0.584 | 0.584 | 0.584 |
| PyHPC Benchmarks - CPU - Numba - 16384 - Equation of State (sec) | 0.001 | 0.001 | 0.001 |
| PyHPC Benchmarks - CPU - Numba - 16384 - Isoneutral Mixing (sec) | 0.003 | 0.003 | 0.003 |
| PyHPC Benchmarks - CPU - Numba - 65536 - Equation of State (sec) | 0.003 | 0.003 | 0.003 |
| PyHPC Benchmarks - CPU - Numba - 65536 - Isoneutral Mixing (sec) | 0.012 | 0.012 | 0.012 |
| PyHPC Benchmarks - CPU - Numpy - 16384 - Equation of State (sec) | 0.002 | 0.002 | 0.002 |
| PyHPC Benchmarks - CPU - Numpy - 16384 - Isoneutral Mixing (sec) | 0.005 | 0.005 | 0.005 |
| PyHPC Benchmarks - CPU - Numpy - 65536 - Equation of State (sec) | 0.013 | 0.013 | 0.013 |
| PyHPC Benchmarks - CPU - Numpy - 65536 - Isoneutral Mixing (sec) | **0.023** | **0.022** | **0.022** |
| Normalized | 95.65% | 100% | 100% |
| PyHPC Benchmarks - CPU - Numba - 262144 - Equation of State (sec) | 0.01 | 0.01 | 0.01 |
| PyHPC Benchmarks - CPU - Numba - 262144 - Isoneutral Mixing (sec) | **0.045** | 0.046 | **0.047** |
| Normalized | 100% | 97.83% | 95.74% |
| PyHPC Benchmarks - CPU - Numpy - 262144 - Equation of State (sec) | **0.051** | **0.064** | **0.051** |
| Normalized | 100% | 79.69% | 100% |
| PyHPC Benchmarks - CPU - Numpy - 262144 - Isoneutral Mixing (sec) | **0.091** | **0.089** | **0.089** |
| Normalized | 97.8% | 100% | 100% |
| PyHPC Benchmarks - CPU - Numba - 1048576 - Equation of State (sec) | 0.042 | 0.042 | 0.042 |

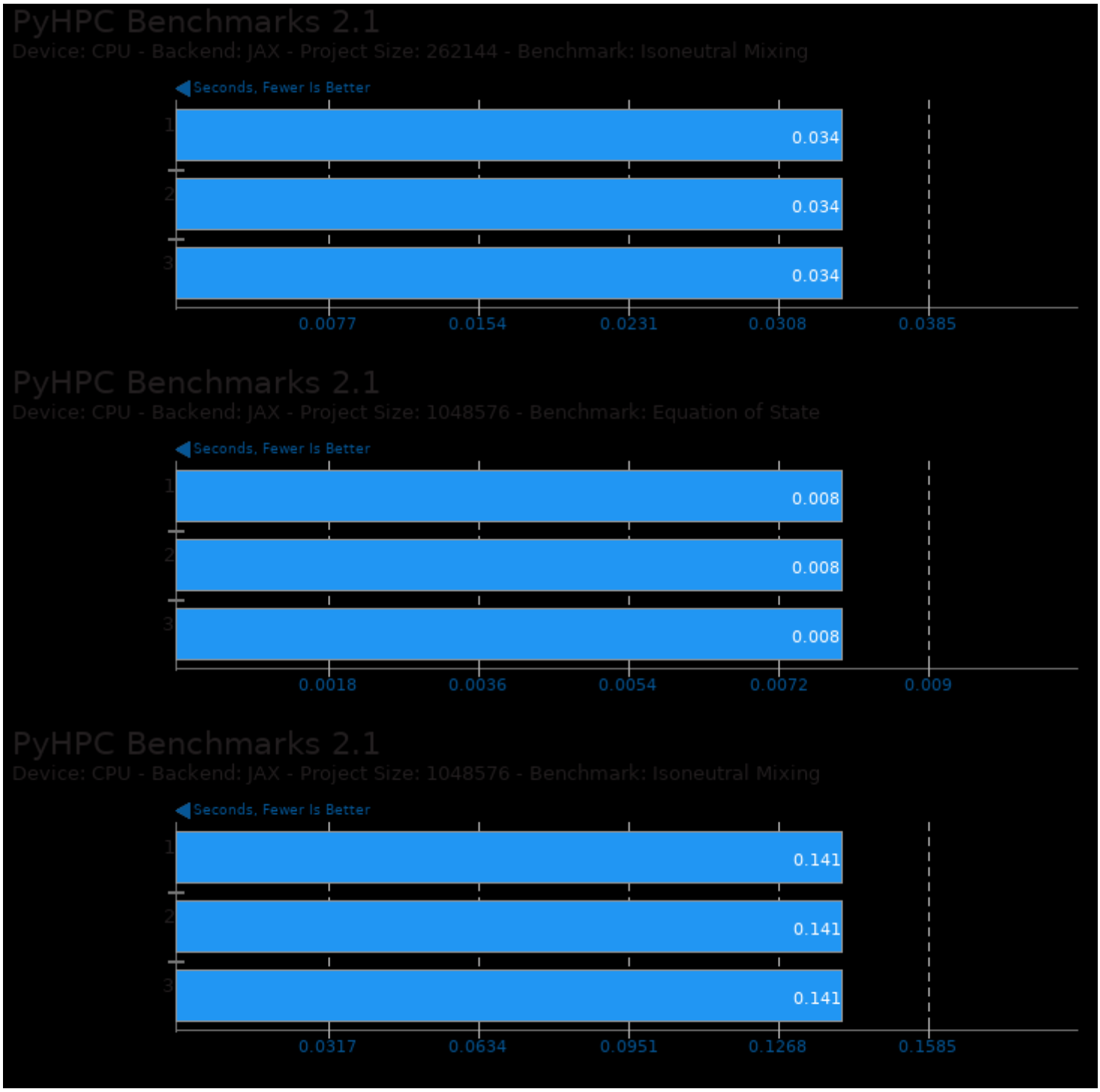
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| | | | |
|---|---|---|---|
| **PyHPC Benchmarks - CPU - Numba - 1048576 - Isoneutral Mixing (sec)** | 0.196 | 0.196 | 0.196 |
| **PyHPC Benchmarks - CPU - Numba - 4194304 - Equation of State (sec)** | **0.167** | **0.171** | **0.167** |
| **Normalized** | 100% | 97.66% | 100% |
| **PyHPC Benchmarks - CPU - Numba - 4194304 - Isoneutral Mixing (sec)** | **0.8** | **0.8** | **0.802** |
| **Normalized** | 100% | 100% | 99.75% |
| **PyHPC Benchmarks - CPU - Numpy - 1048576 - Equation of State (sec)** | **0.239** | **0.239** | **0.24** |
| **Normalized** | 100% | 100% | 99.58% |
| **PyHPC Benchmarks - CPU - Numpy - 1048576 - Isoneutral Mixing (sec)** | 0.416 | **0.417** | **0.415** |
| **Normalized** | 99.76% | 99.52% | 100% |
| **PyHPC Benchmarks - CPU - Numpy - 4194304 - Equation of State (sec)** | **1.25** | **1.25** | **1.247** |
| **Normalized** | 99.76% | 99.76% | 100% |
| **PyHPC Benchmarks - CPU - Numpy - 4194304 - Isoneutral Mixing (sec)** | **1.816** | 1.817 | **1.819** |
| **Normalized** | 100% | 99.94% | 99.84% |

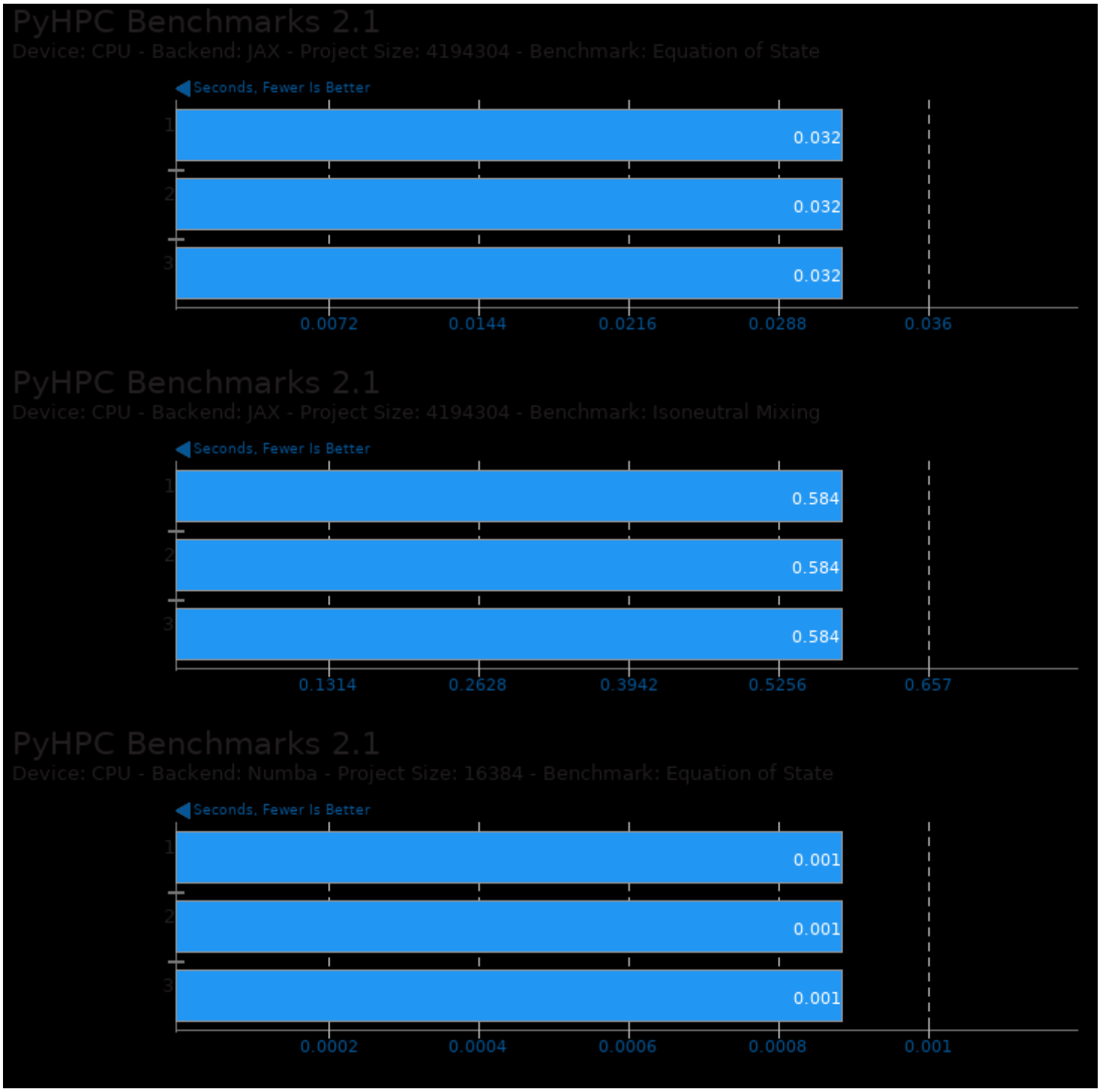
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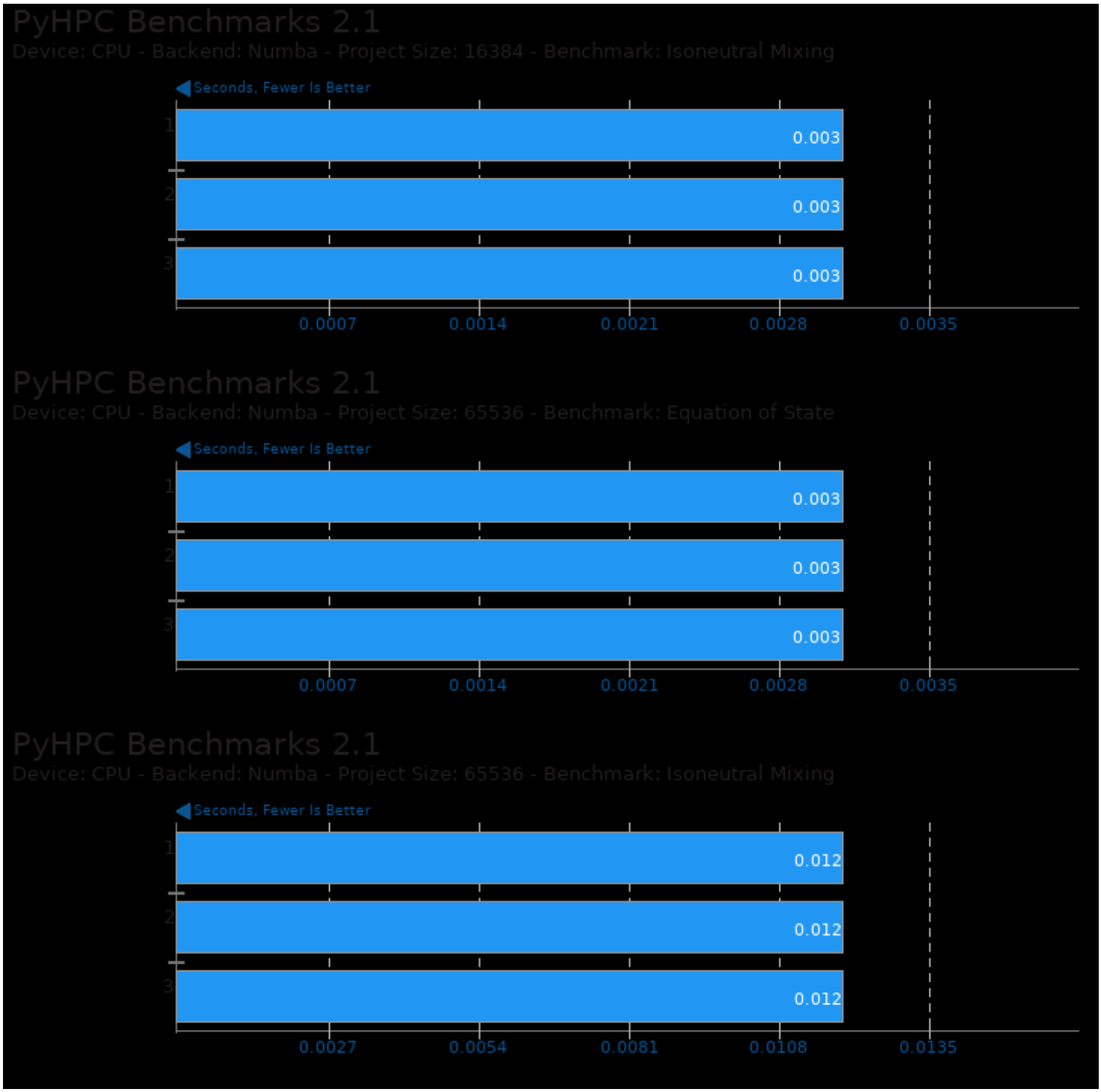
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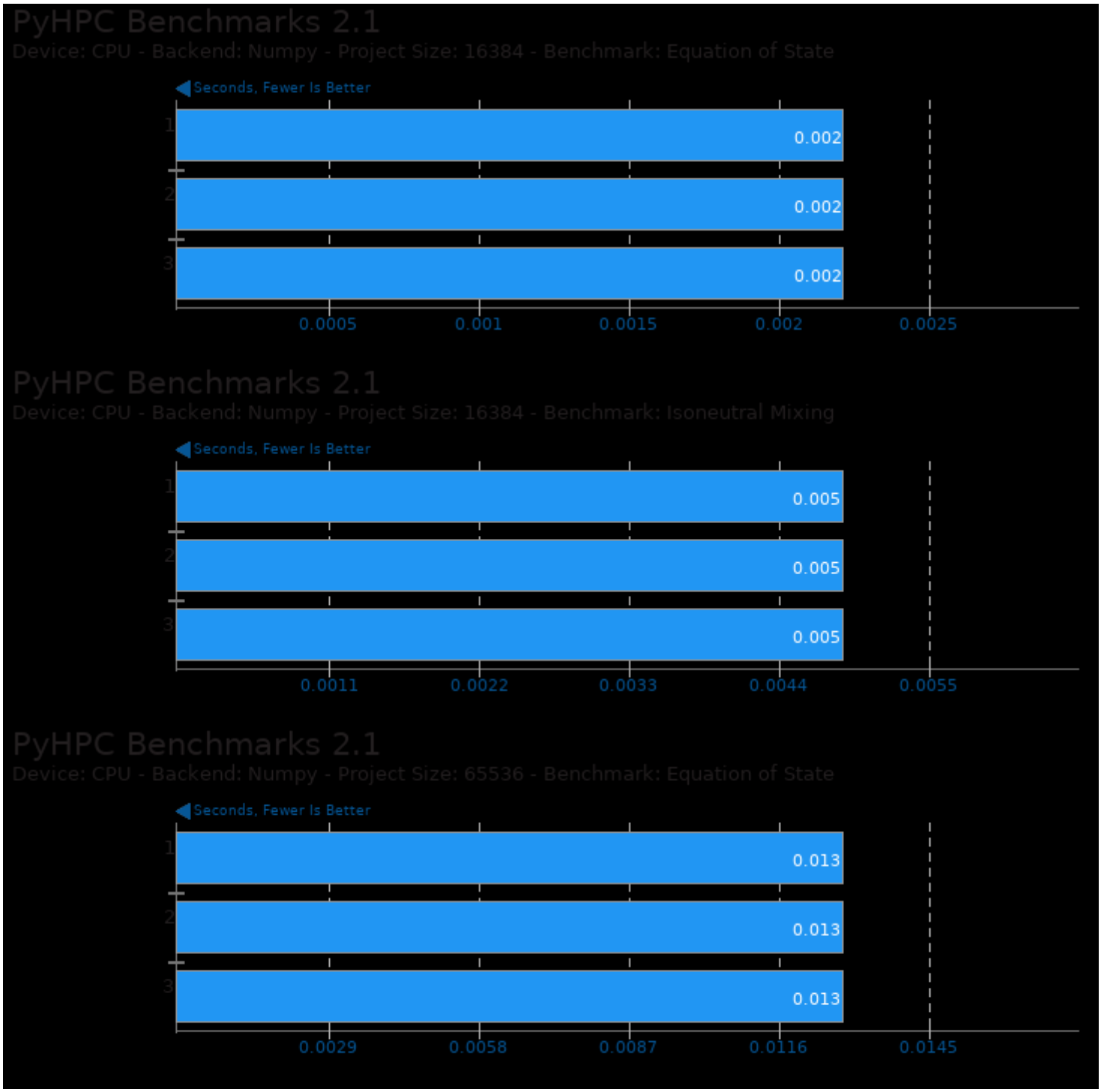
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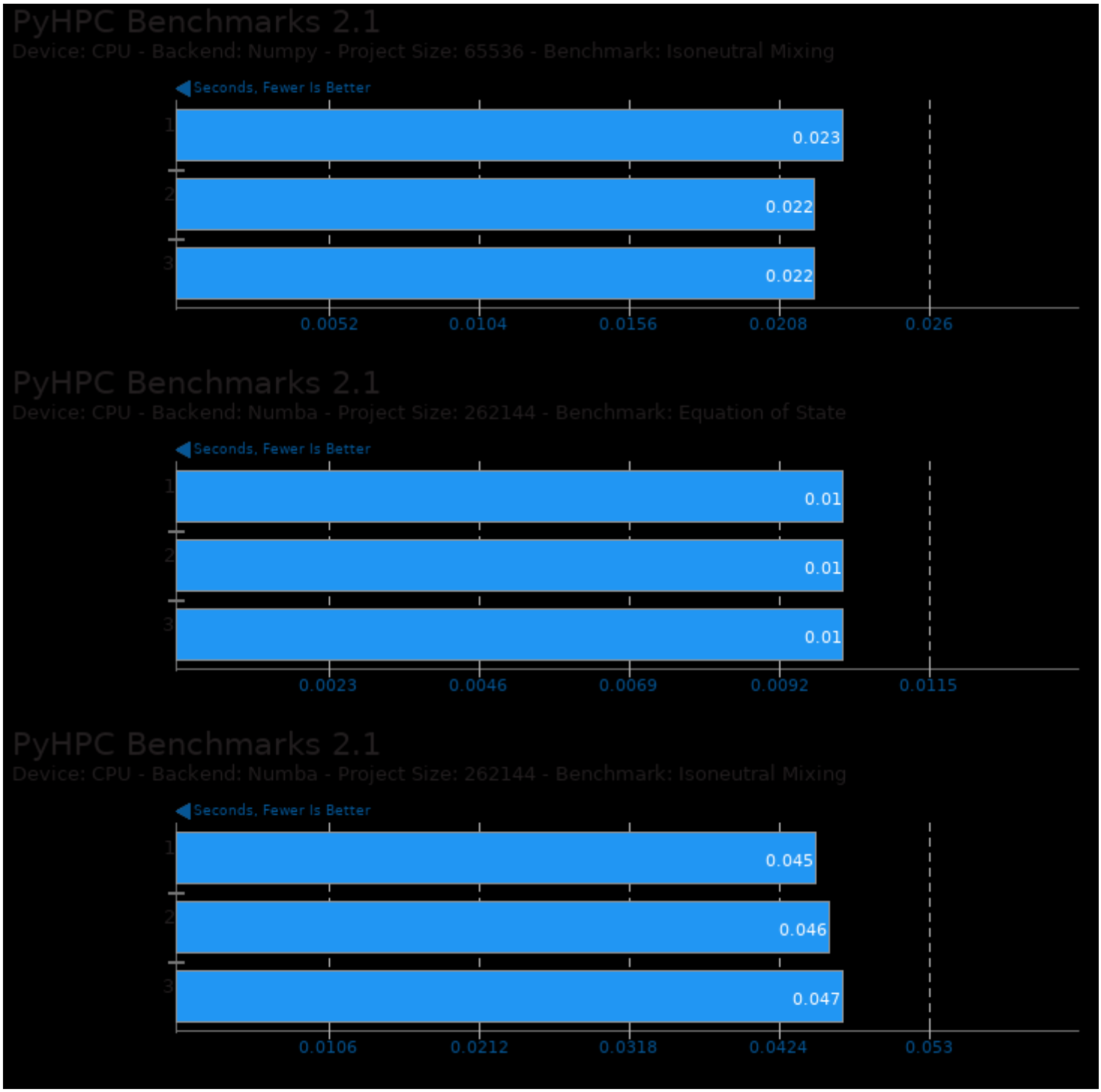
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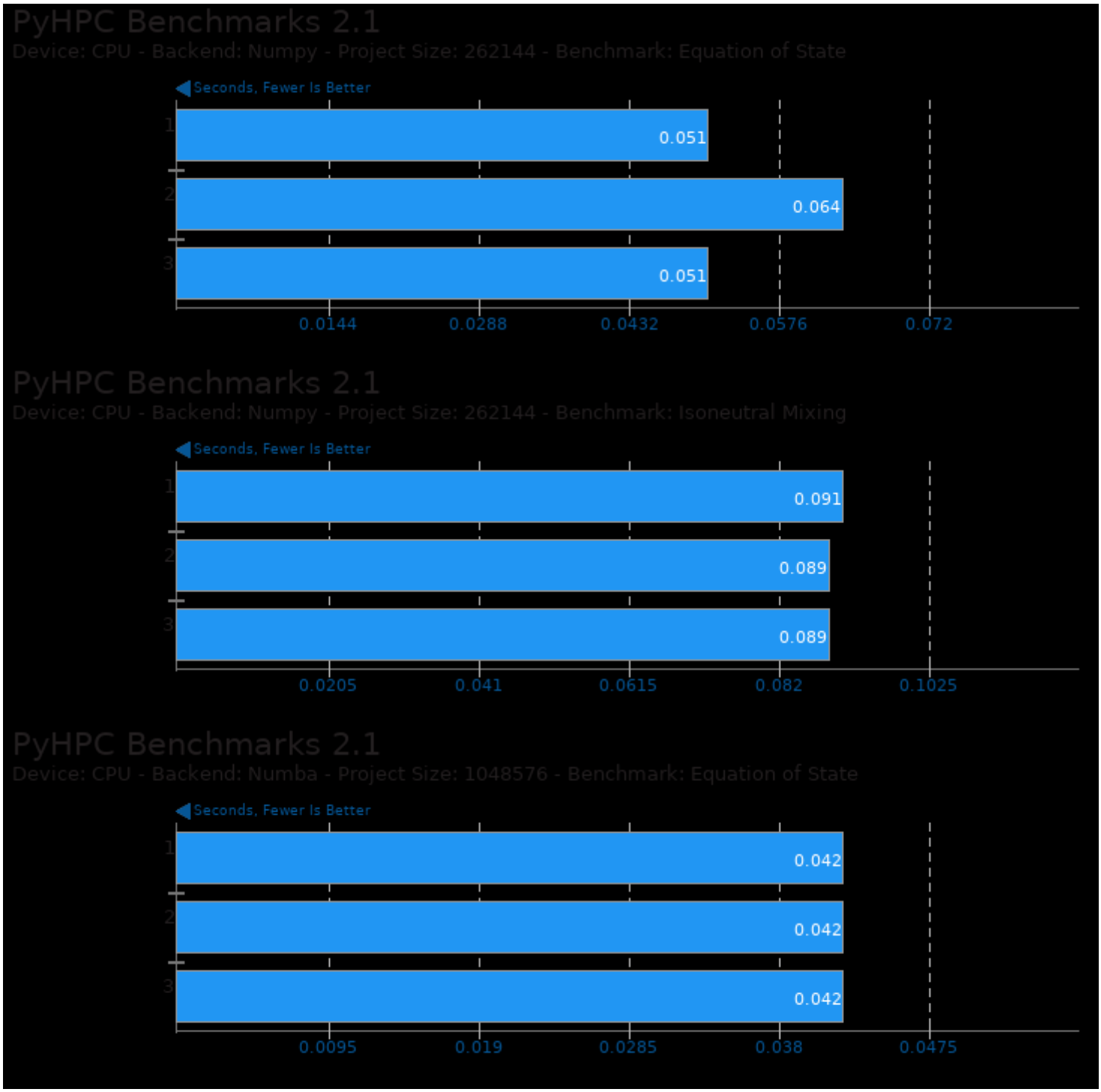
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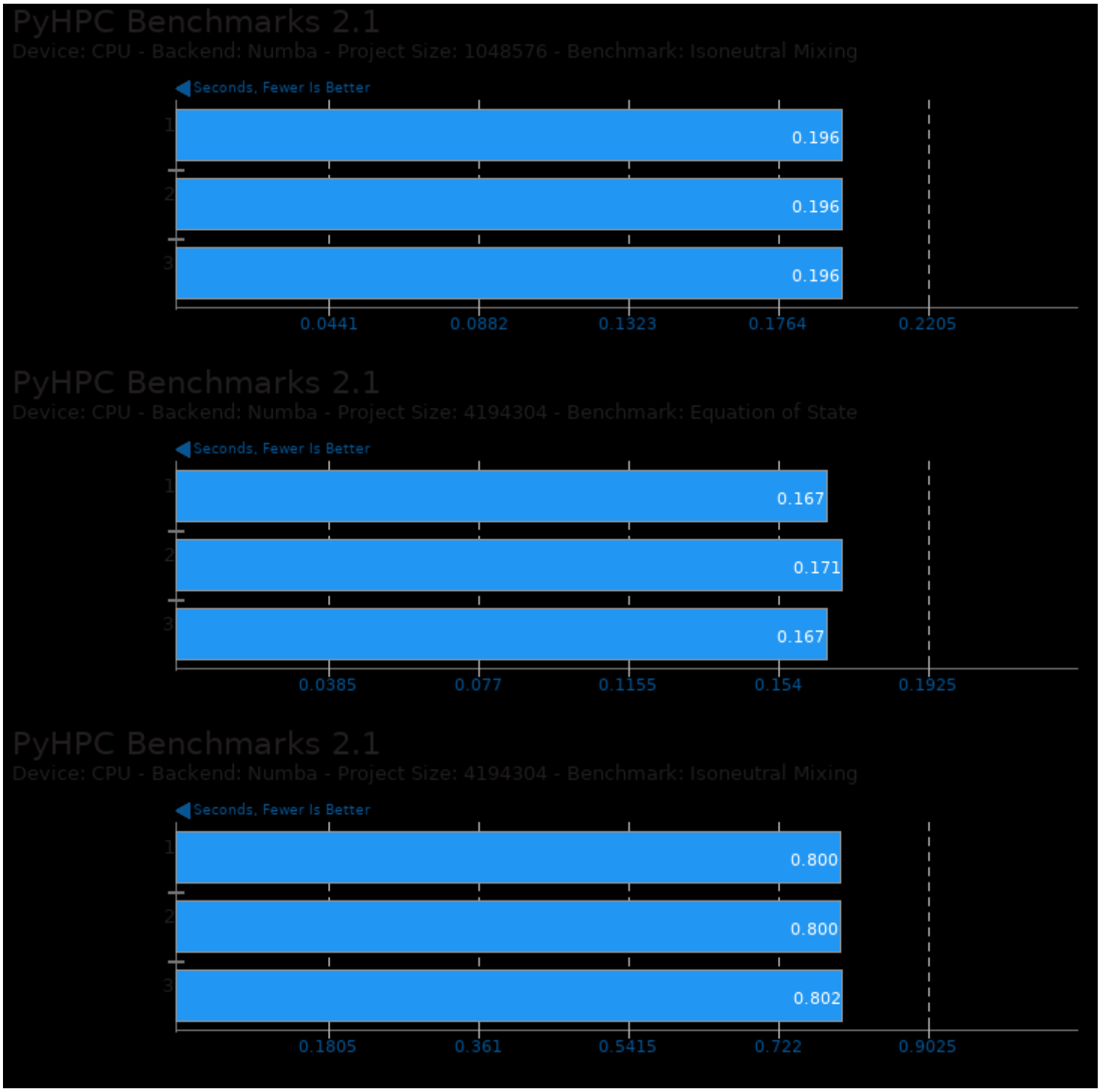
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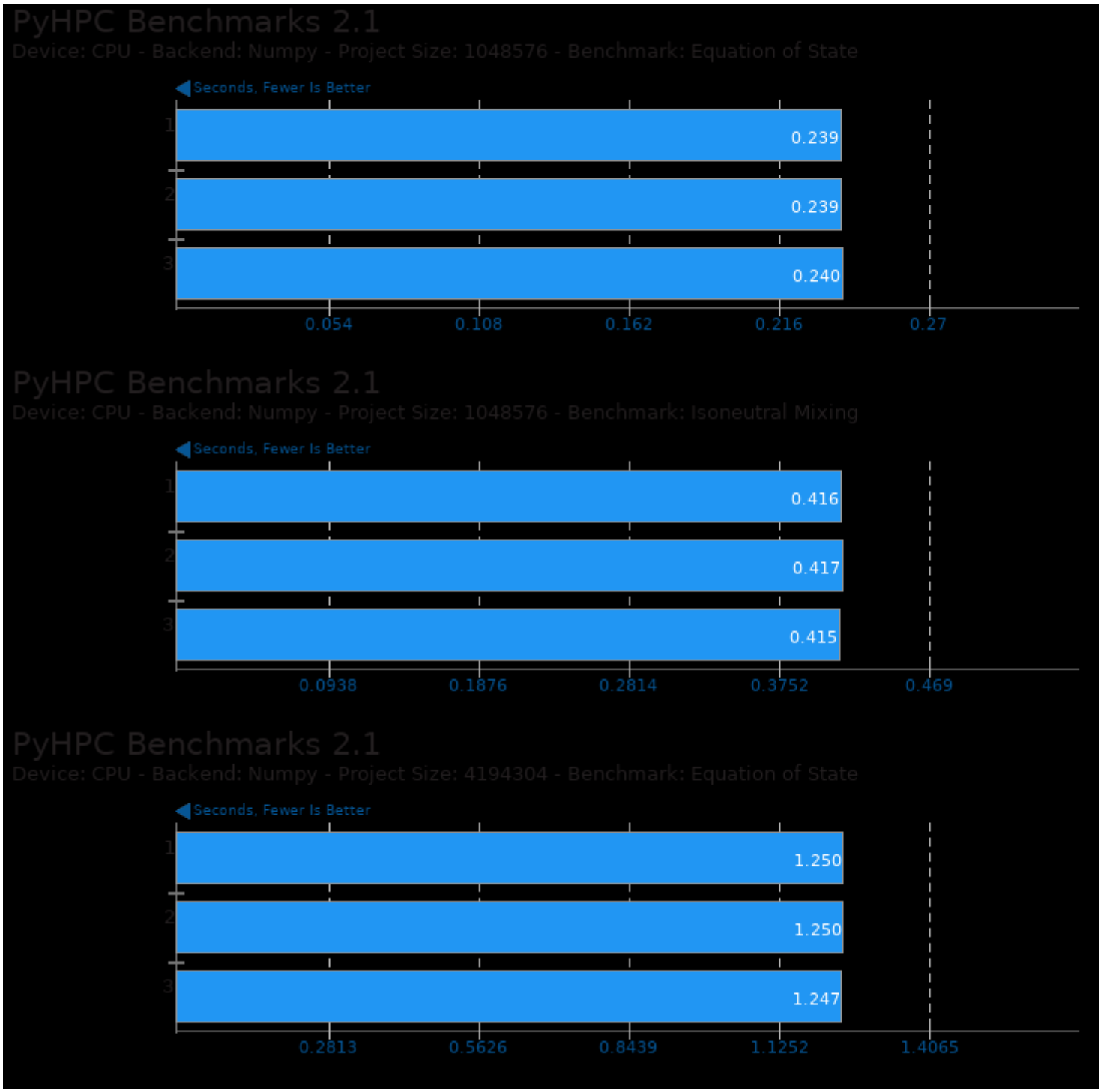
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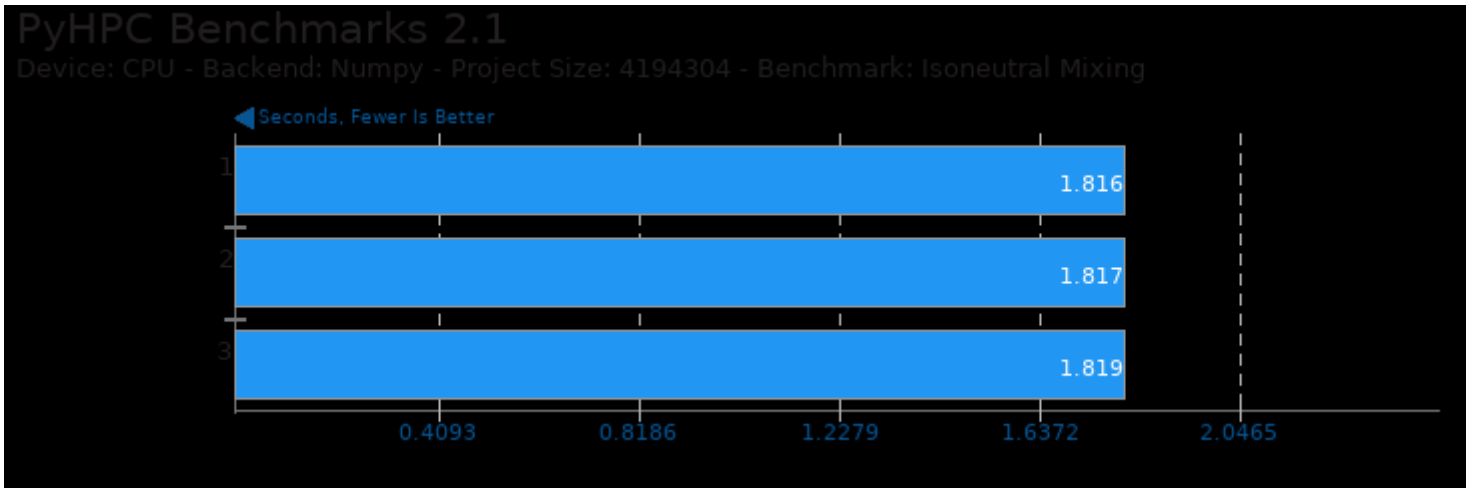
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