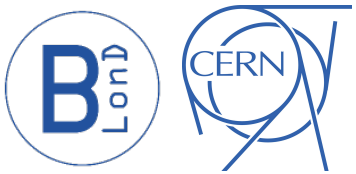
BLonD Meeting

Konstantinos Iliakis



August 4, 2017

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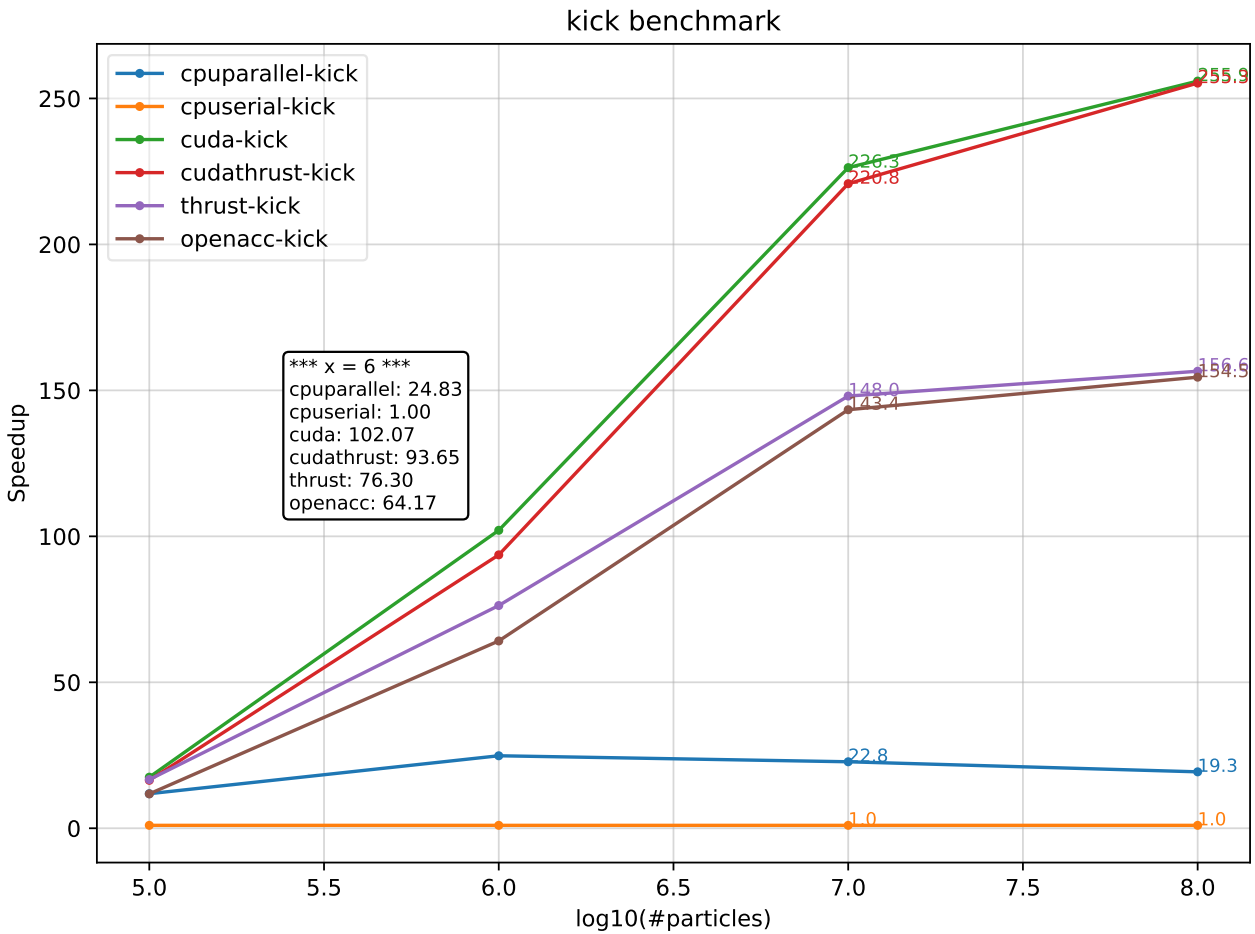
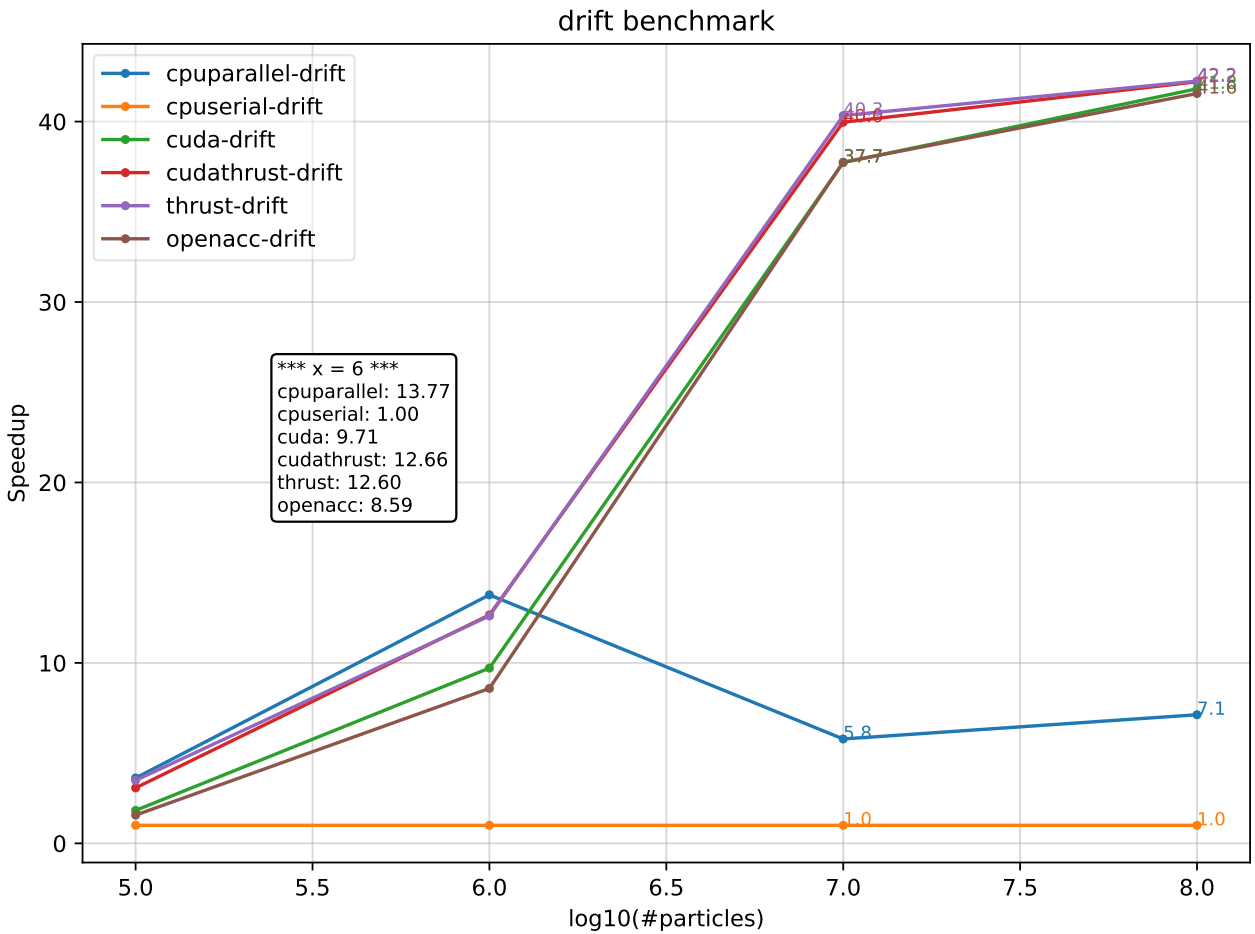
Kick Benchmark



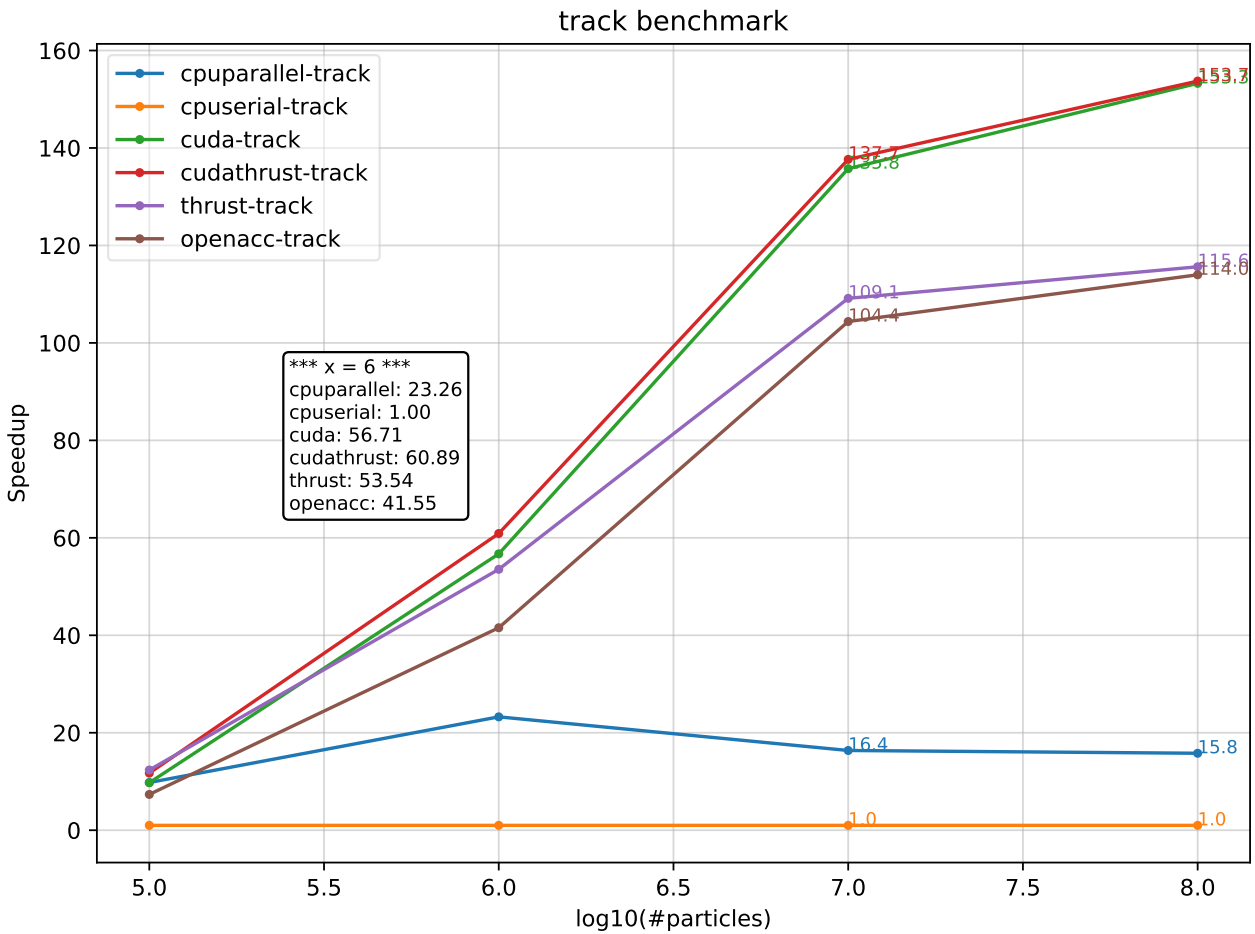
- Speedup compared to CPU C Serial
- Cudathrust:
  - cuda kick
  - thrust drift
- cuda/ cpu-parallel Max Speedup: 13.25x
- Kick throughput

Drift Benchmark



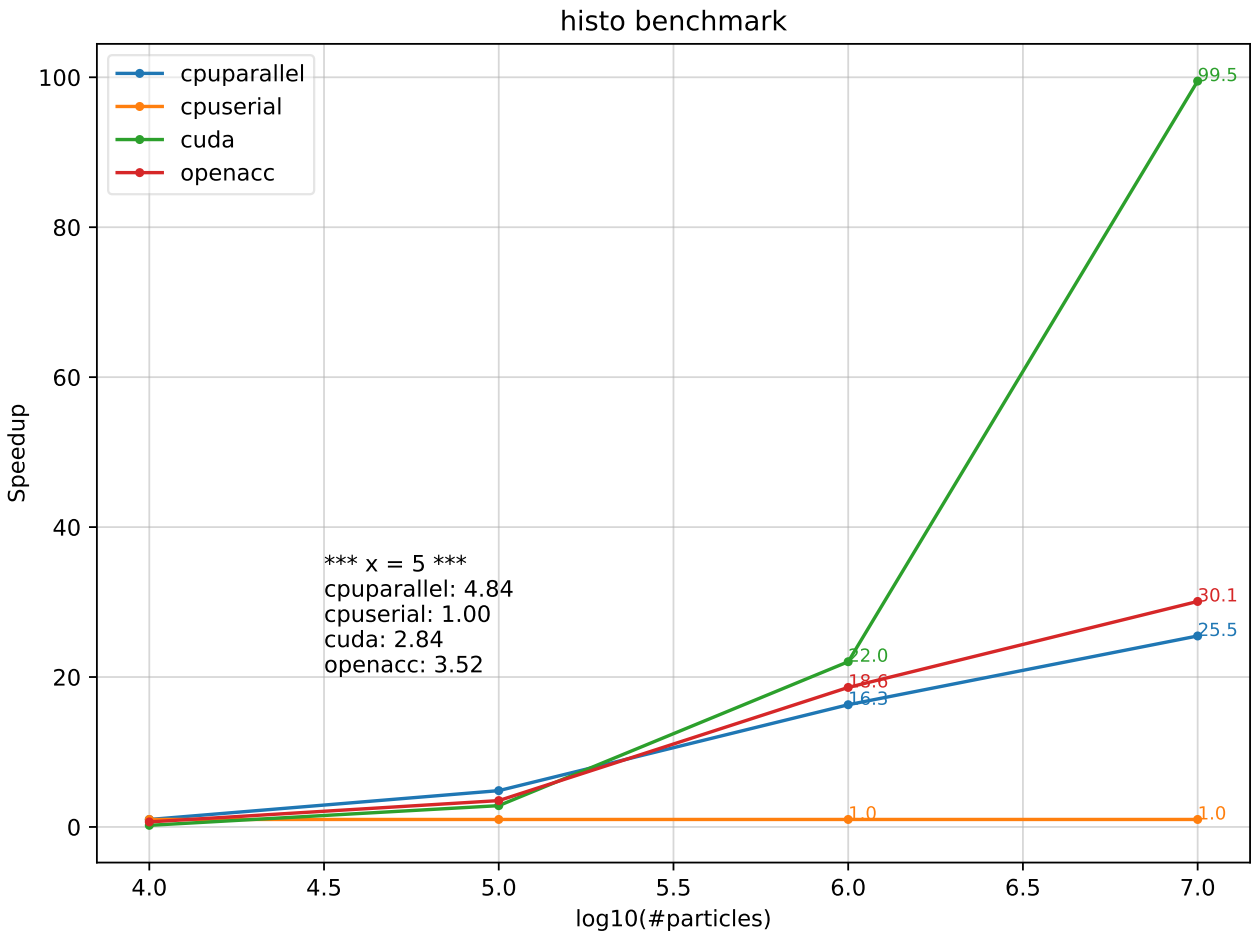
- Speedup compared to CPU C Serial
- Cudathrust:
  - cuda kick
  - thrust drift
- cuda/ cpu-parallel Max Speedup: 5.94x
- Drift throughput

Track Benchmark



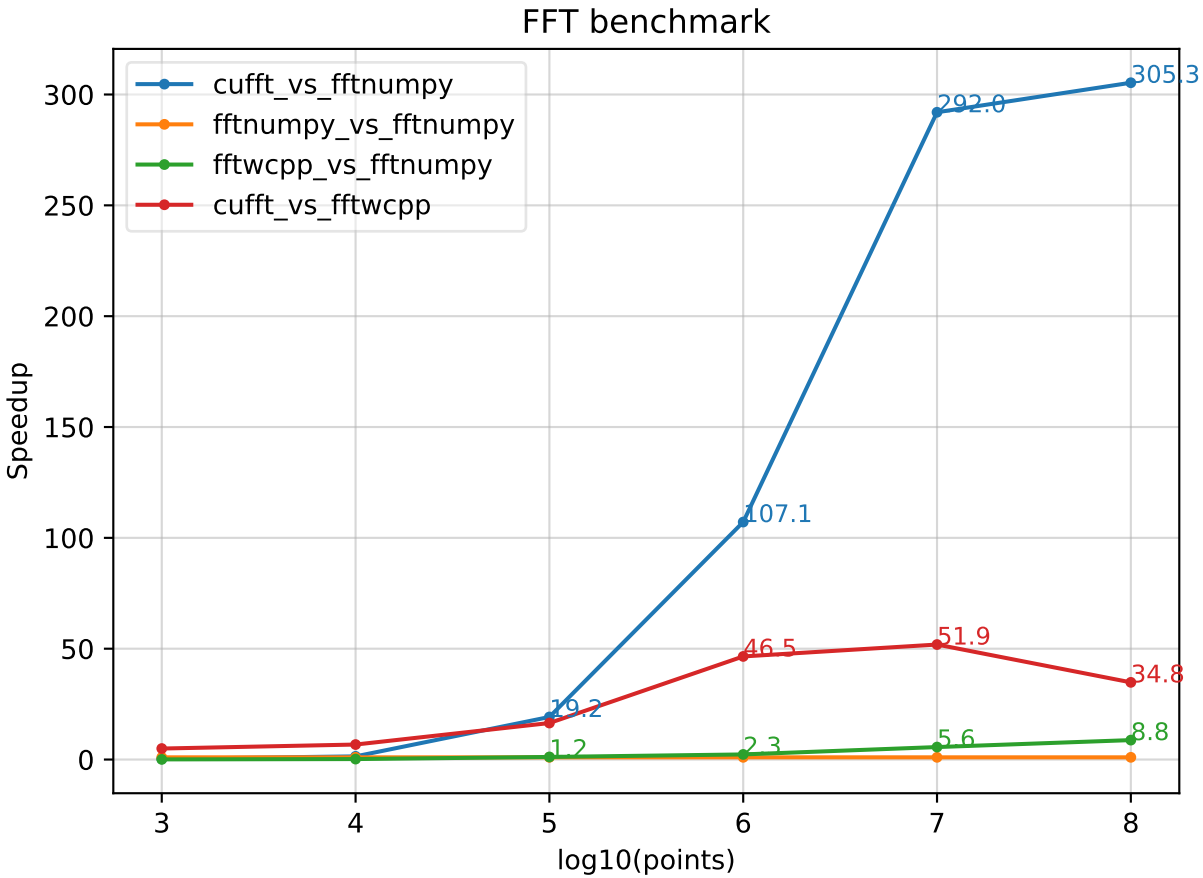
- Speedup compared to CPU C Serial
- Stable turn times
- Cudathrust:
  - cuda kick
  - thrust drift
- cuda/ cpu-parallel Max Speedup: 9.72x
- Track throughput

Histogram Benchmark



- Speedup compared to CPU C Serial
- cuda/ cpu-parallel Max Speedup: 3.9x
- Histogram throughput

FFT benchmark

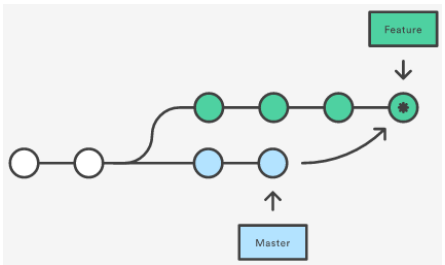


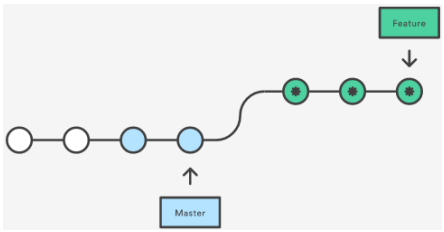
- Only benchmarked rfft (real $\rightarrow$ complex)
- Using the multi-threaded version of fftw
- fftw will potentially improve further with even larger ffts
- FFT throughput

Pre-push Script

A python script in blond that will

- Run the unit-tests and print a report
- (Optionally) Auto-format the code to comply with our standards (autopep8)
- (Optionally) git pull, check if no conflicts, git push
  - Gives as the opportunity to control the way users push
  - Squashed commits
  - git merge vs rebase



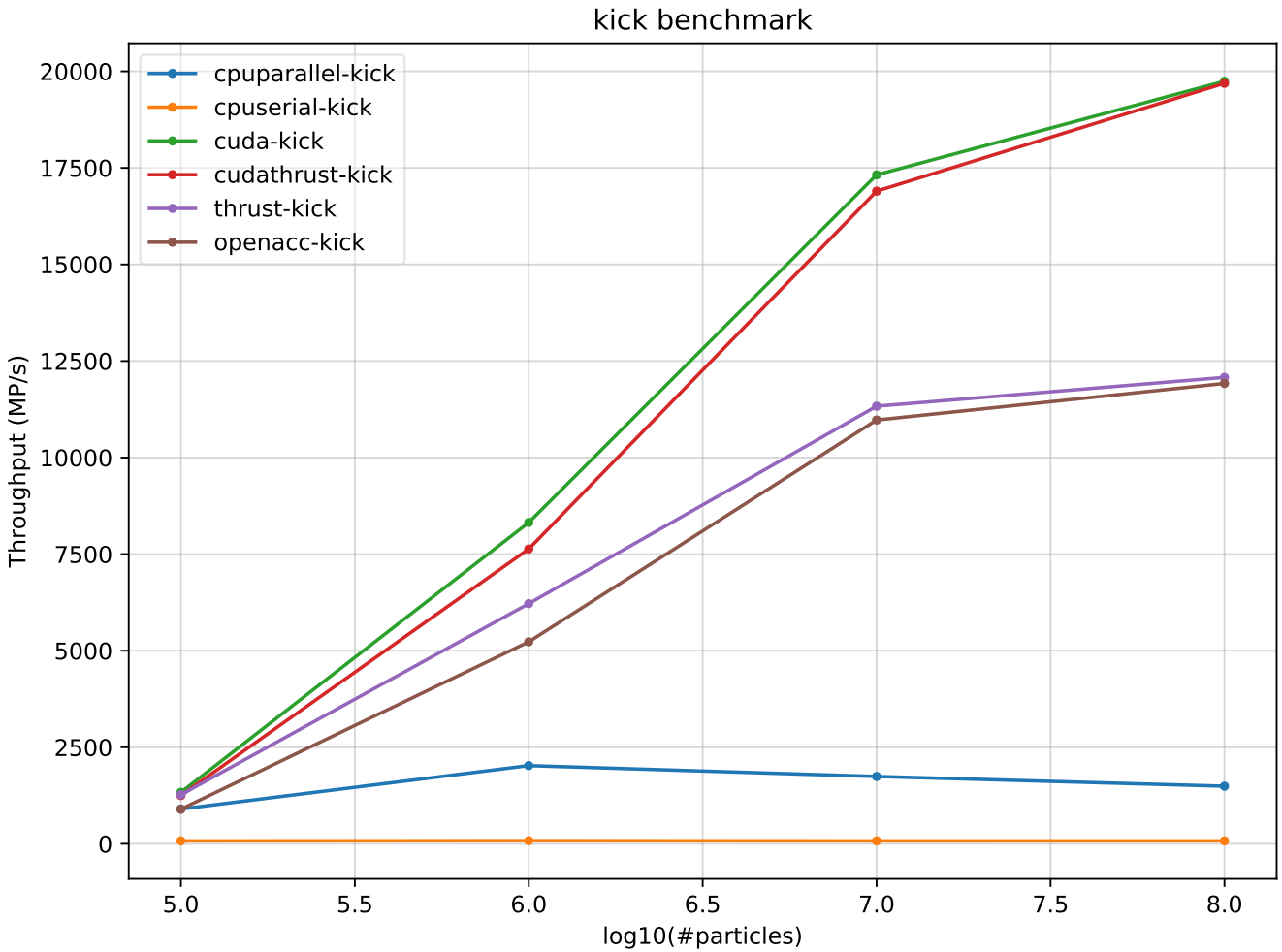


On-going work

- Finish profiling Helga's test-case (LHC_acc_3b)
  - (Single thread) 40.16% Particles tracking
  - 39.21% `hamiltonian()`
  - 15.39% `histogram()`
  - 2.45% `induced_voltage_sum()`
- Do the same with Danilo's test-case
- `linear_interp_kick()` cuda implementation is ready but not benchmarked yet

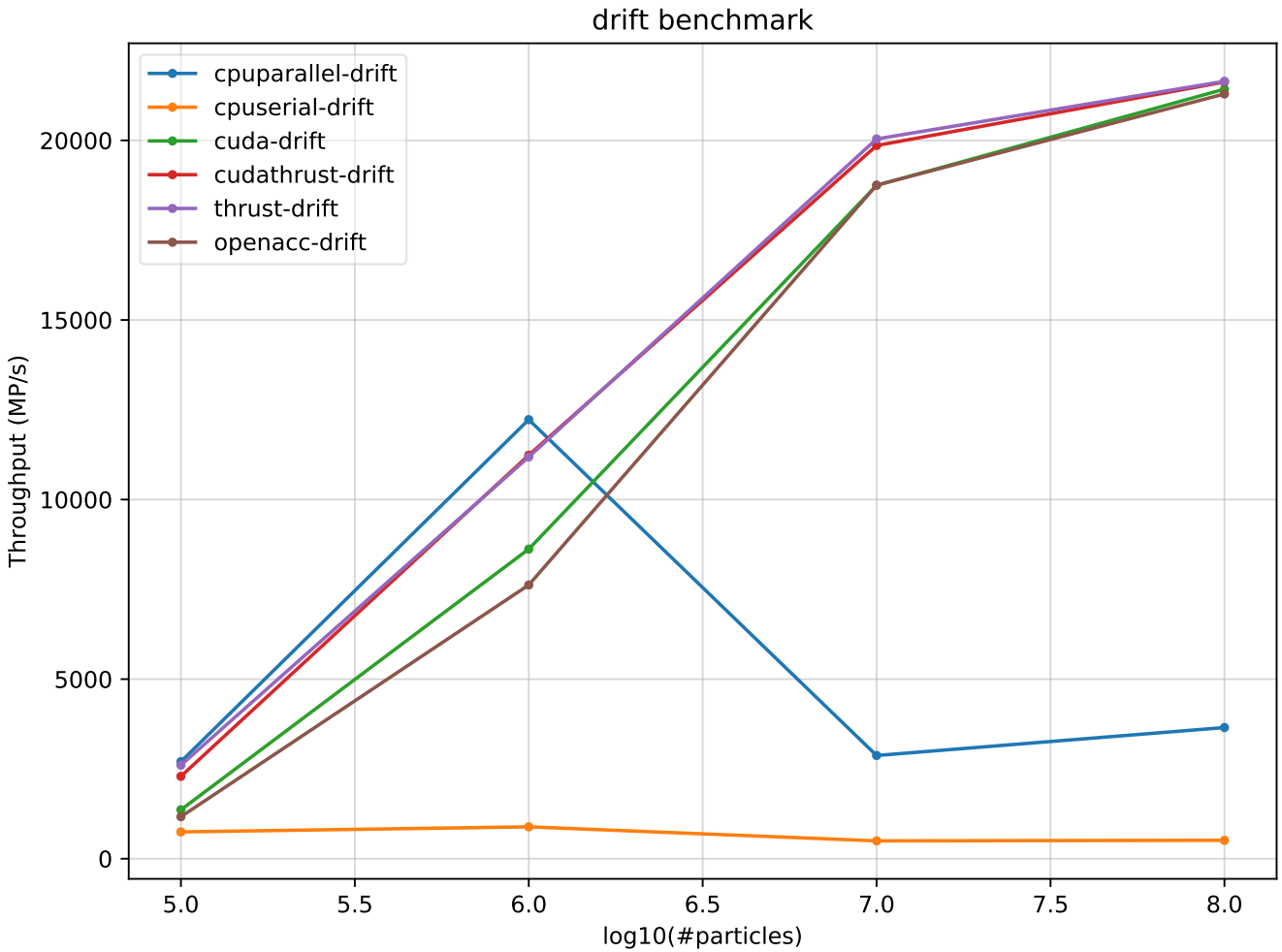
Thank you for your attention

Kick Throughput



Back to Kick Speedup

Drift Throughput



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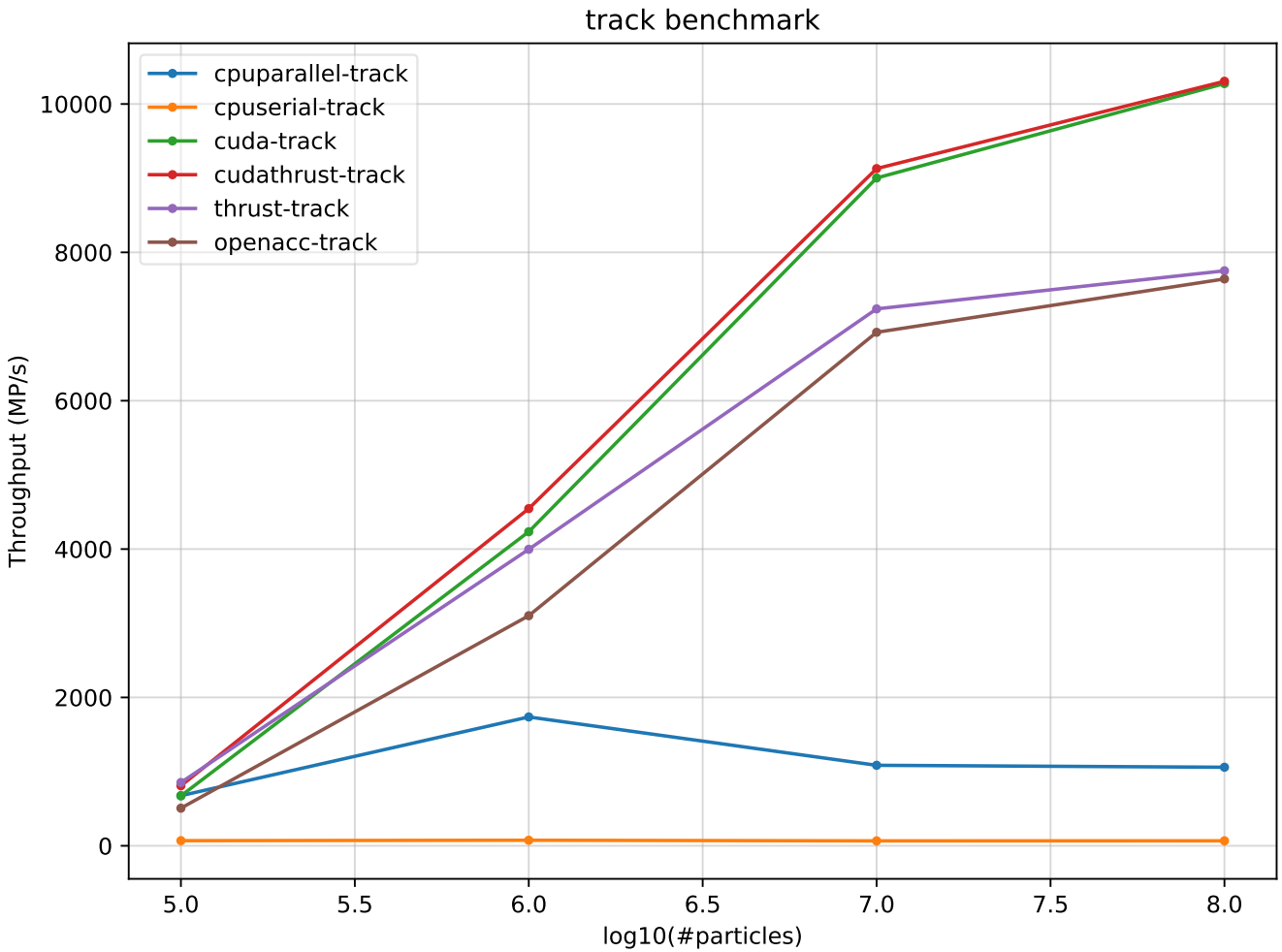
Track Throughput



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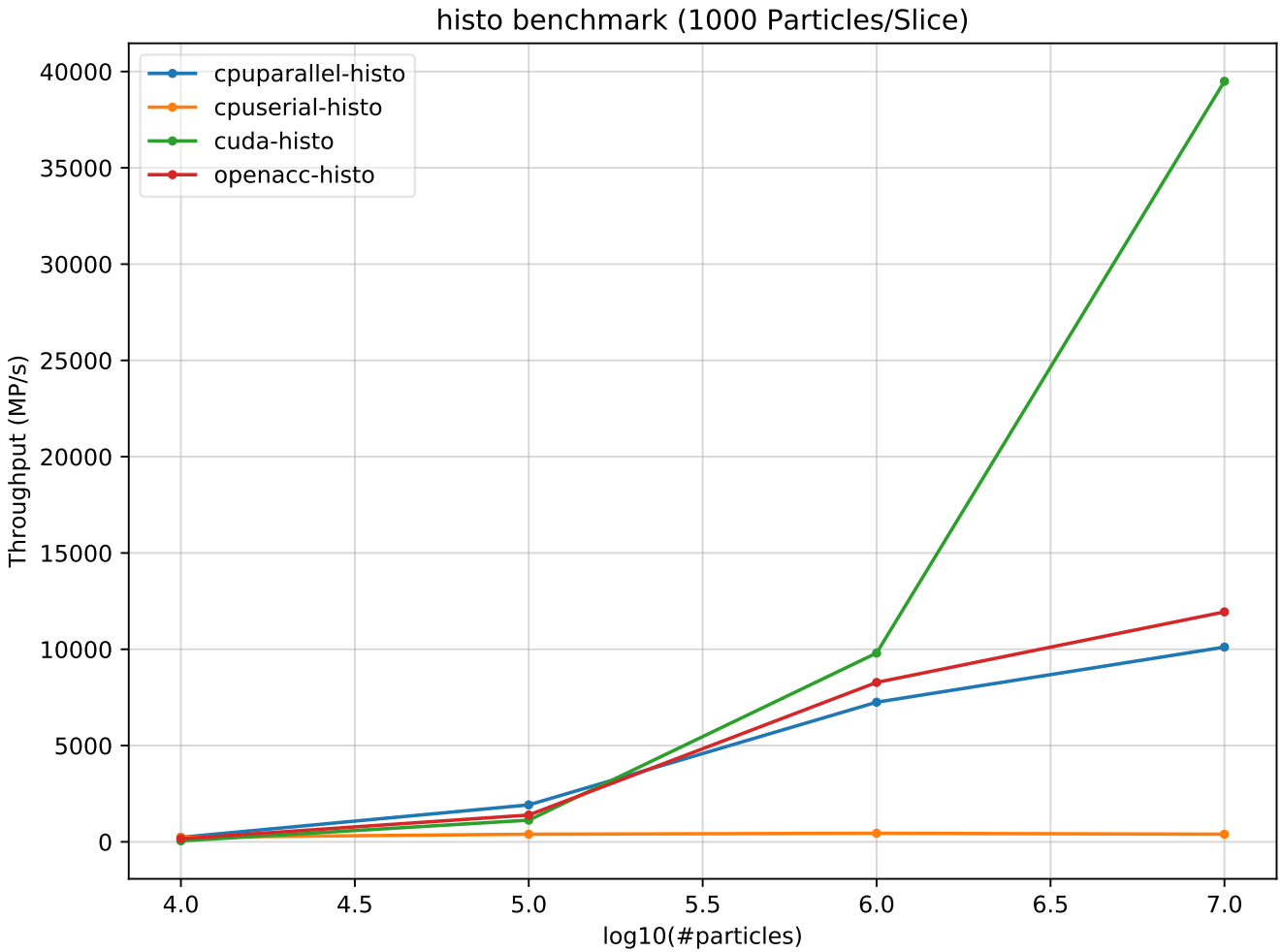
Histogram Throughput



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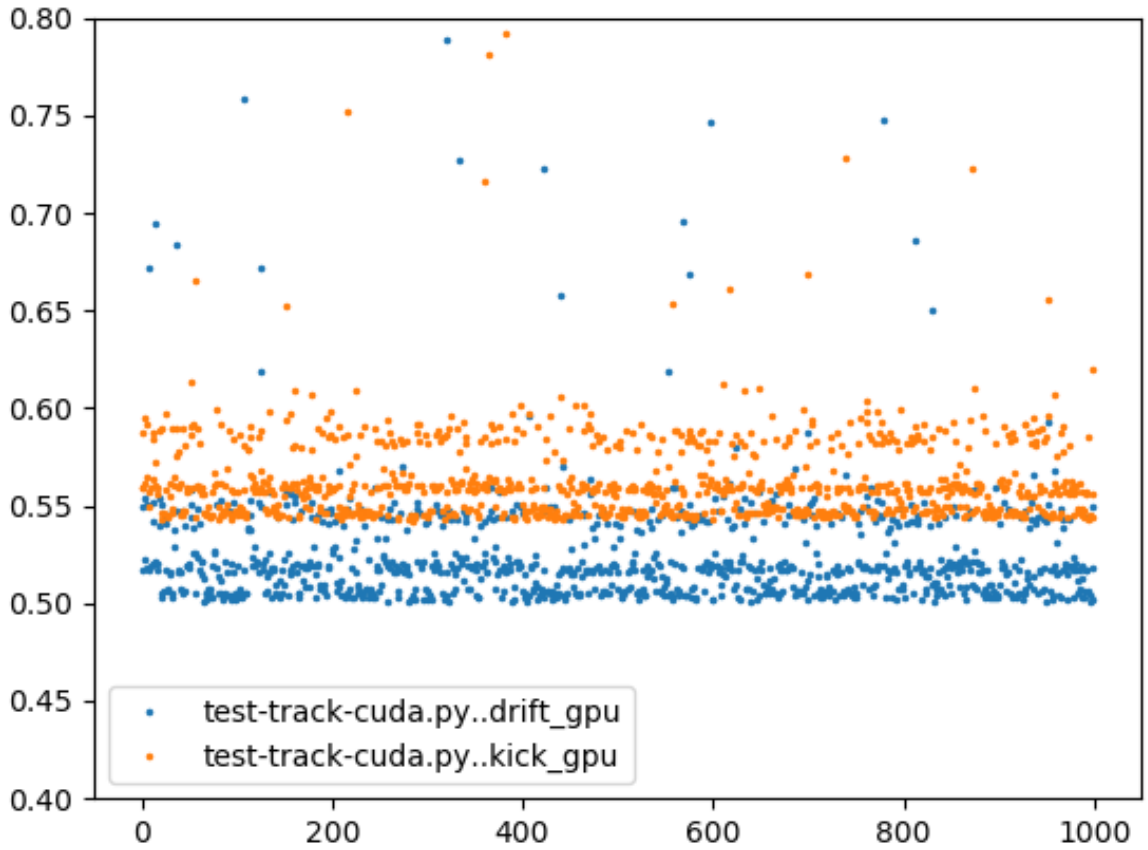
Track Turn Times



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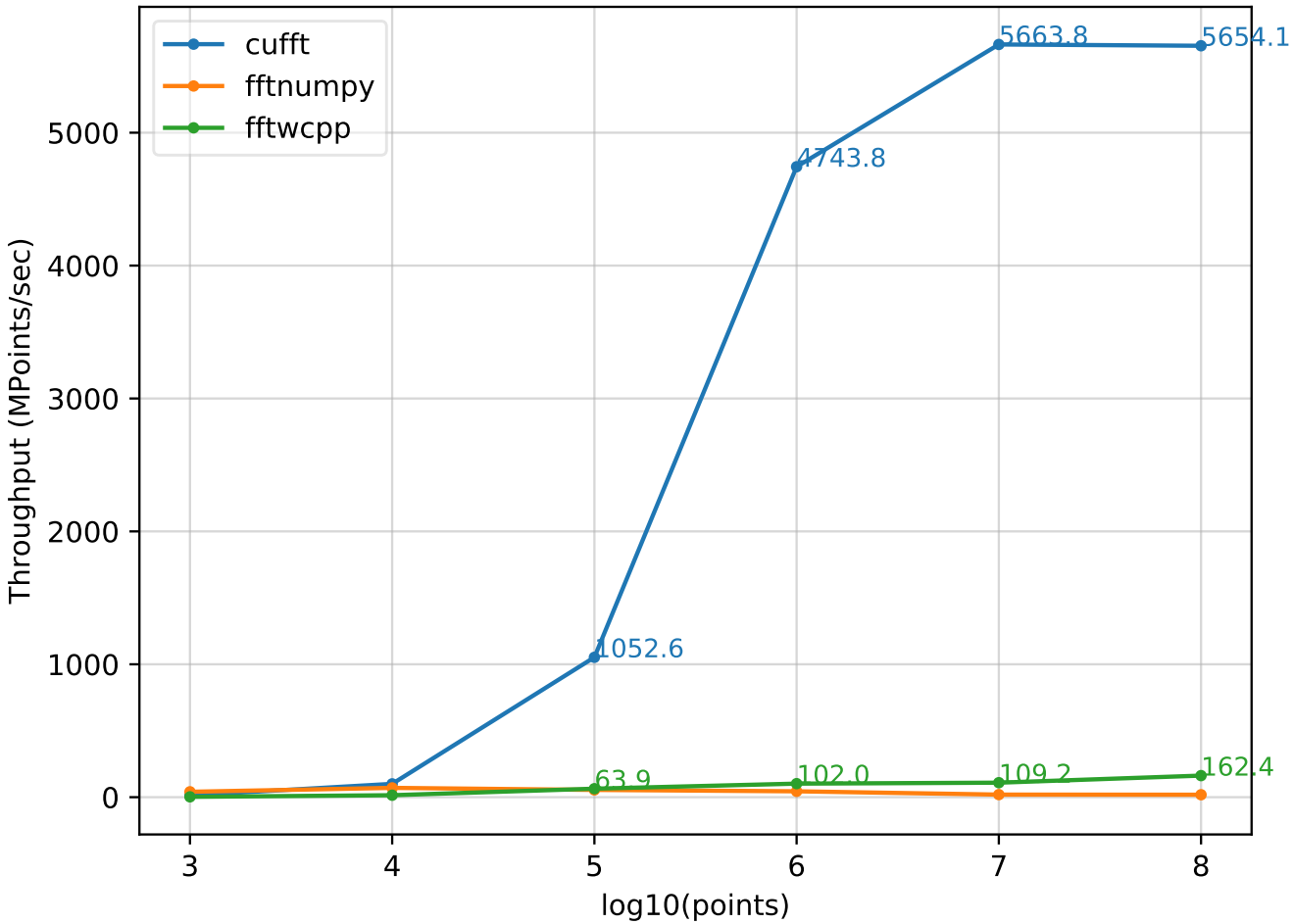
FFT Throughput



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