

Benchmark Cross Correlation Algorithms

Table 1: Benchmark Cross Correlation Algorithms

Algorithm	CorrelationMatrix Kernel	CuBlas-MatrixReduce Kernel	Total time
Baseline	9 ms	1.3 ms	10.3 ms
Optimized with Shared Memory & Index Simplify	6.2 ms	1.3 ms	7.5 ms

Benchmark CorrelationMatrix Kernel

Table 2: Benchmark CorrelationMatrix Kernel

Operation	Time
Memory Loading from CPU (PCIe3)	5.5 ms (4 ms limited by PCIe3)
Calculation (index and correlation)	4.4 ms
Memory loading + Calculation (Whole algorithm)	6.2 ms (Latency hiding)

Benchmark Magnon Correlation g2

Table 3: Benchmark Magnon Correlation g2 (Nvidia A4000 GPU)

Operation	Time
AutoCorrelation Kernel	6.4 ms
CuBlas: AutoCorrelation Matrix-A Reduce	1.3 ms
CuBlas: AutoCorrelation Matrix-B Reduce	1.3 ms
CuBlas: g2 CrossCorrelation	28 ms
Total Time	37 ms