



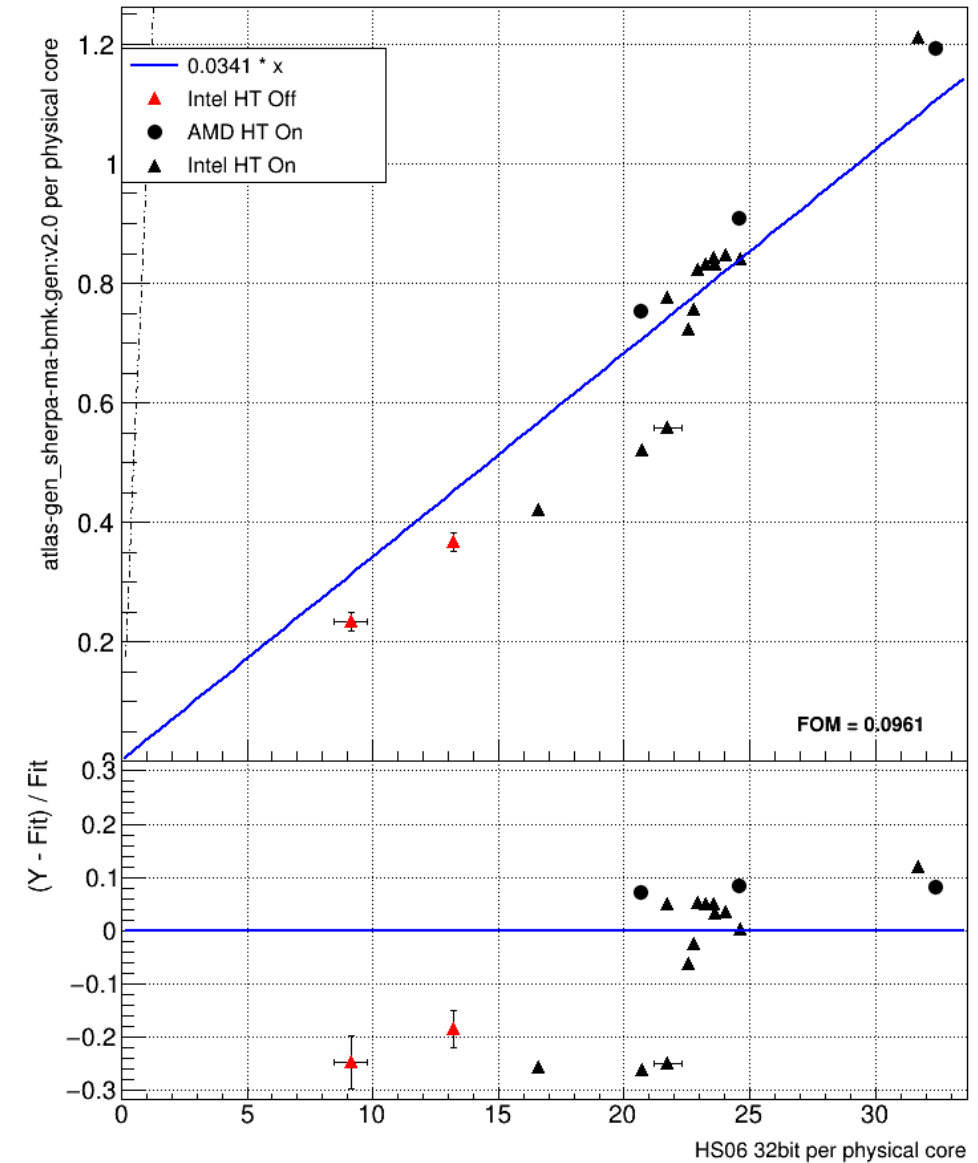
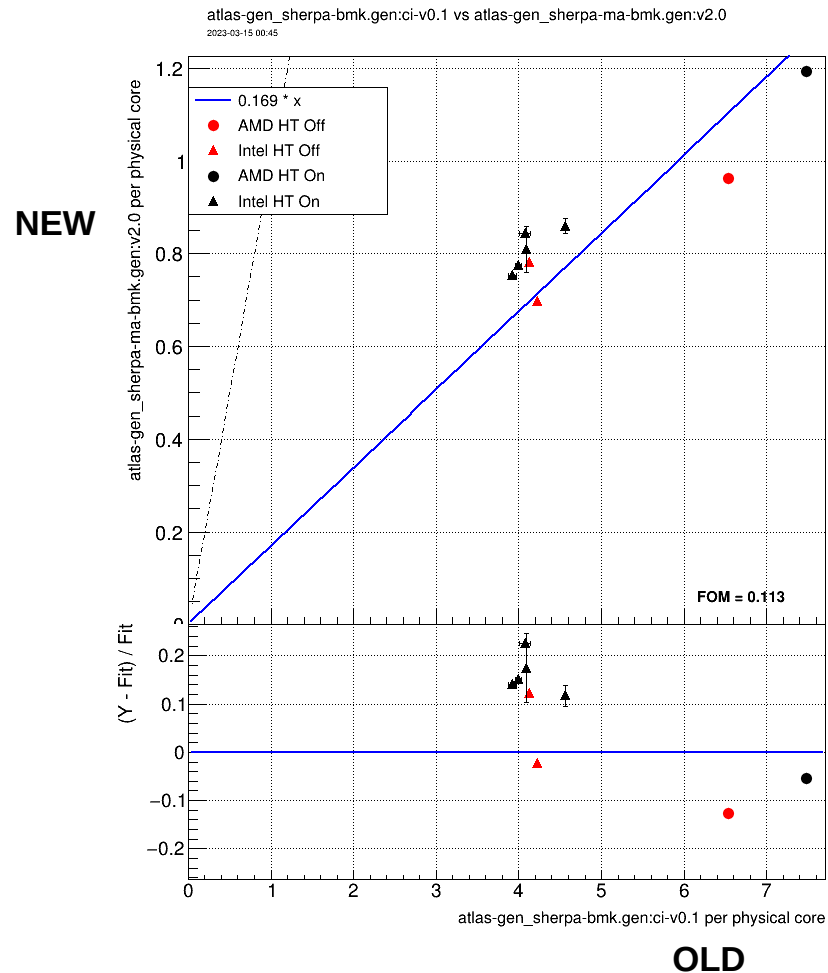
HS23 Workload Analysis

Ladislav Ondris

15 March 2023

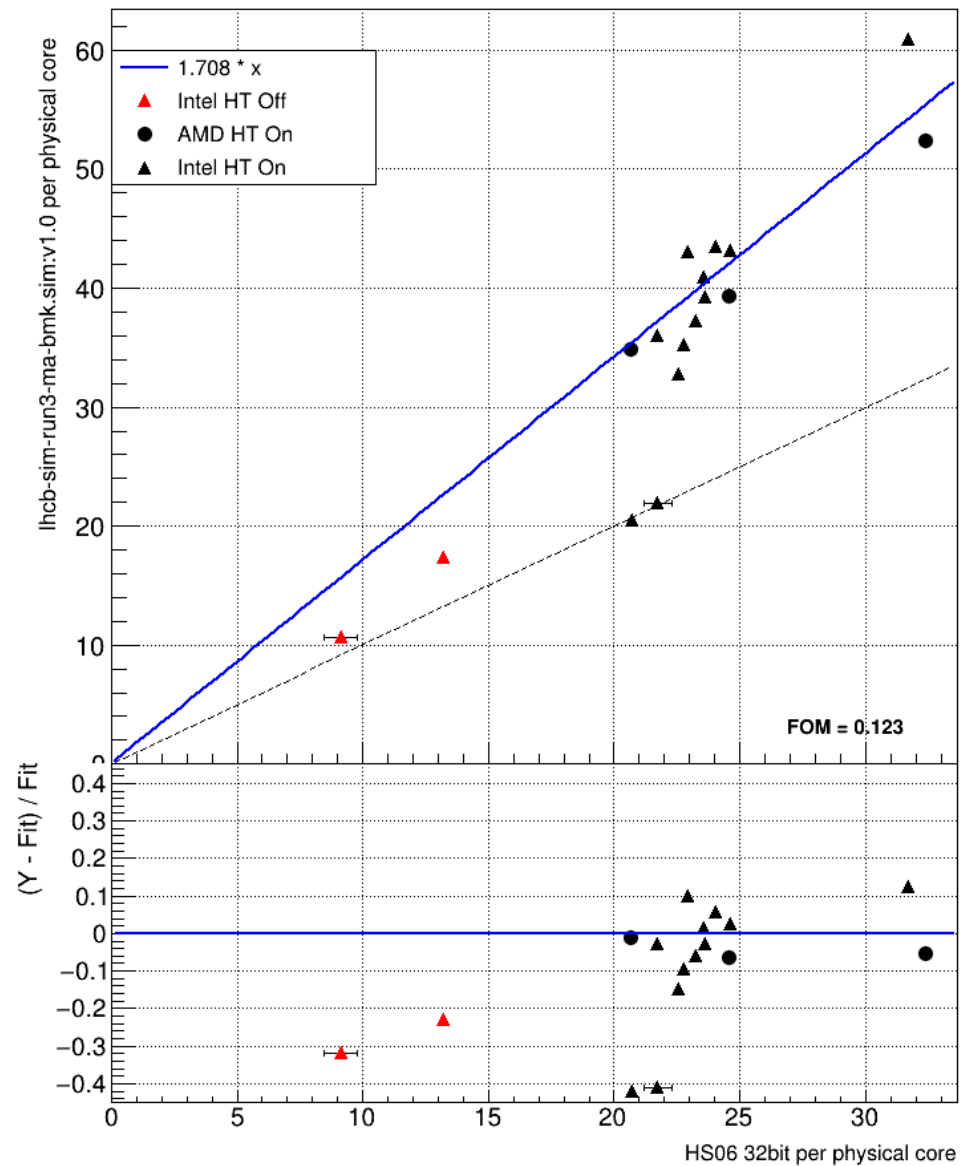
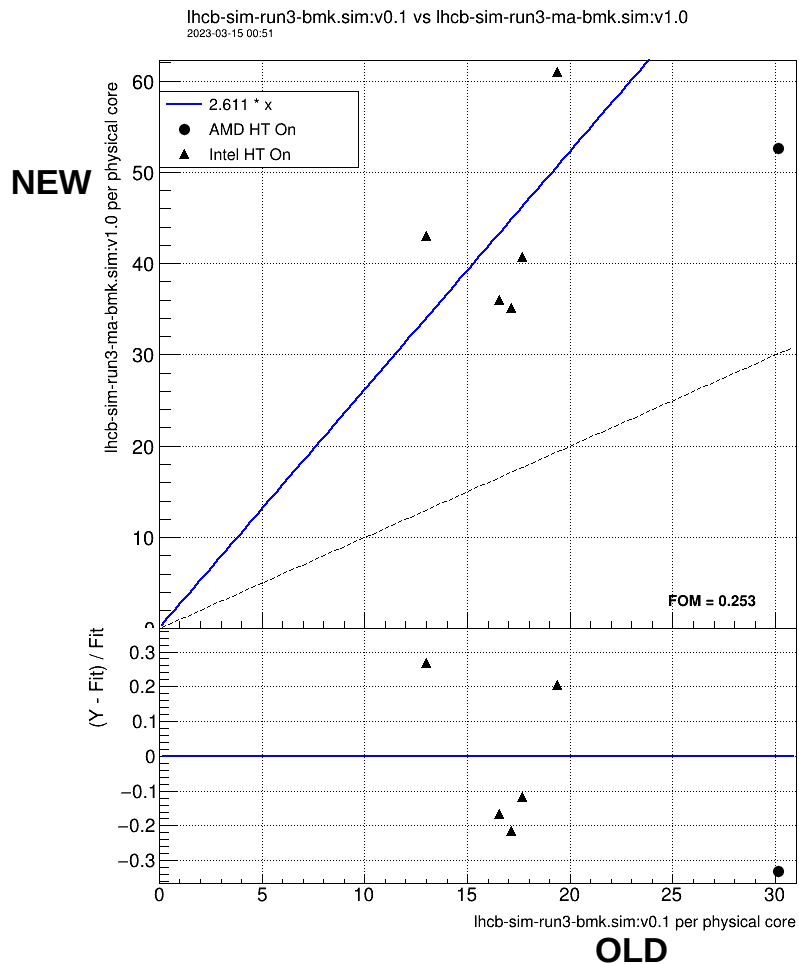
HS06 32bit vs ATLAS gen_sherpa

HS06 32bit vs atlas-gen_sherpa-ma-bmk.gen:v2.0
2023-03-13 10:28



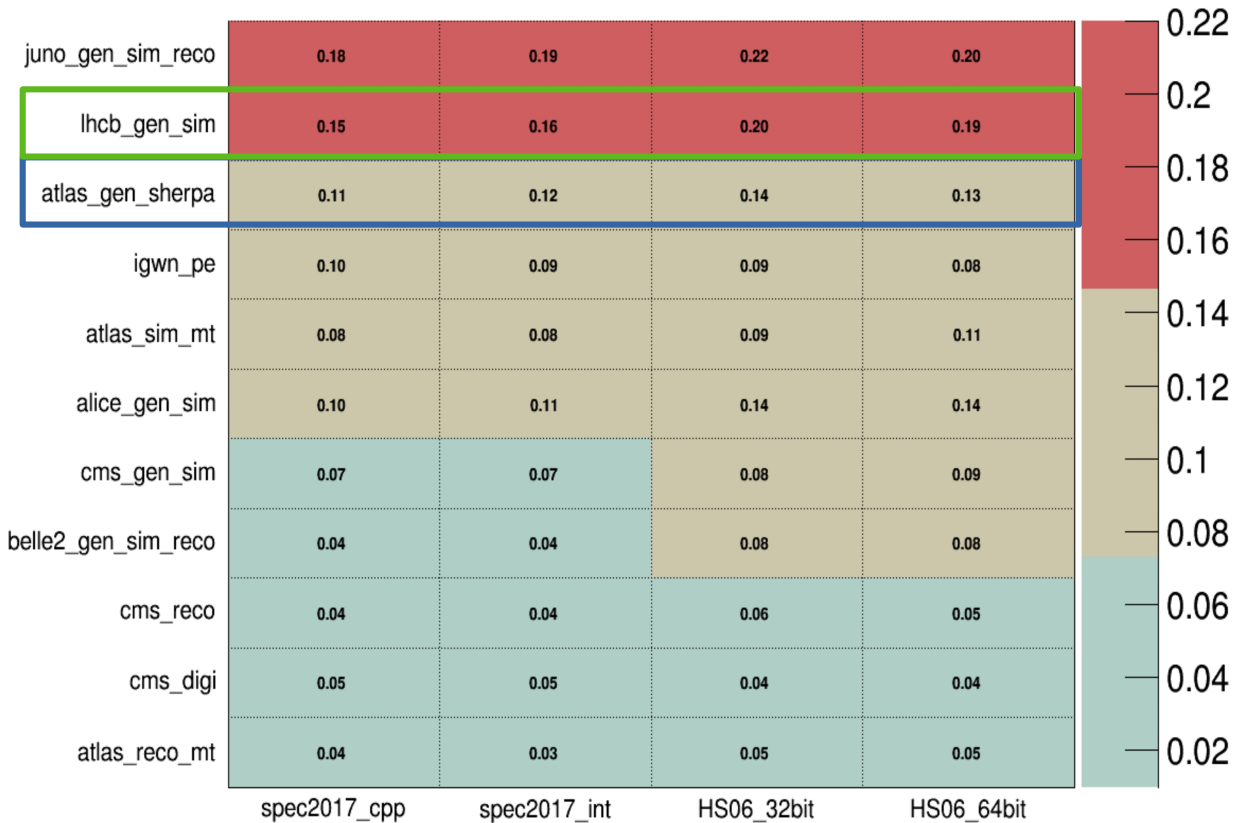
HS06 32bit vs LHCb sim

HS06 32bit vs lhcb-sim-run3-ma-bmk.sim.v1.0
2023-03-13 10:28



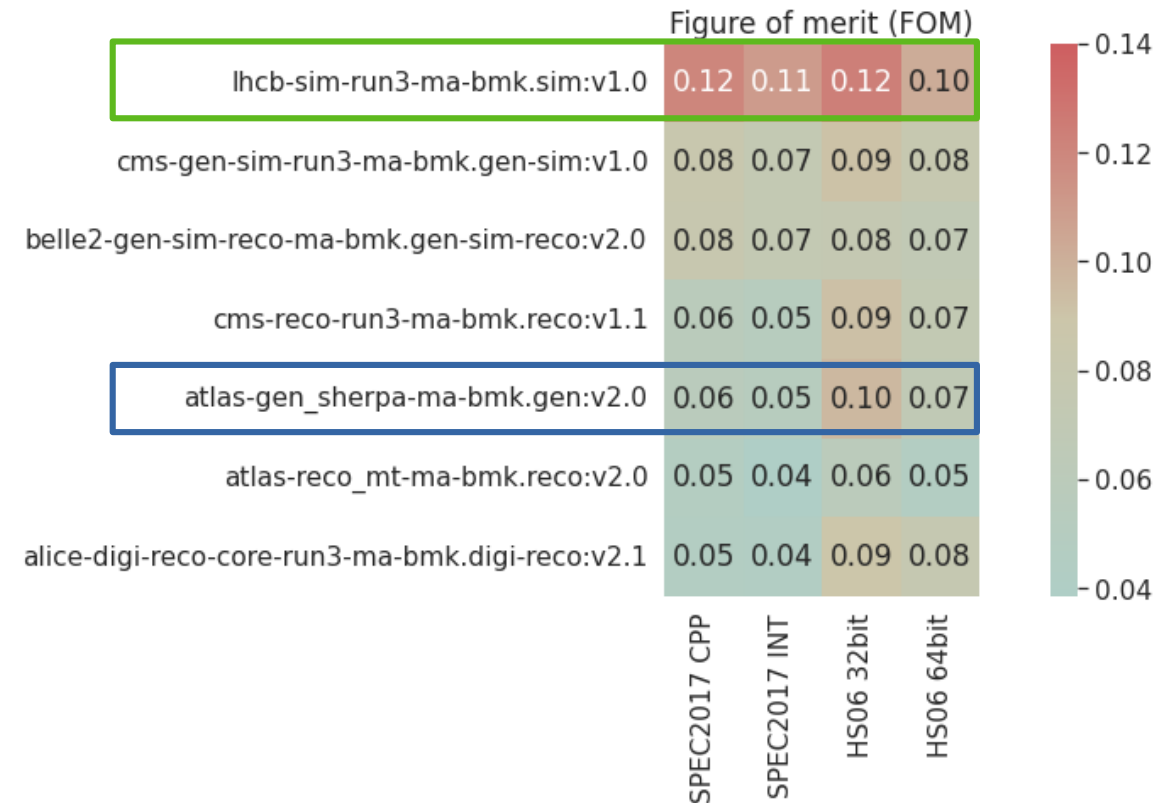
Correlations between HEP-workloads and HS06/SPEC2017

Mean deviation from fit
2022-07-08 16:18



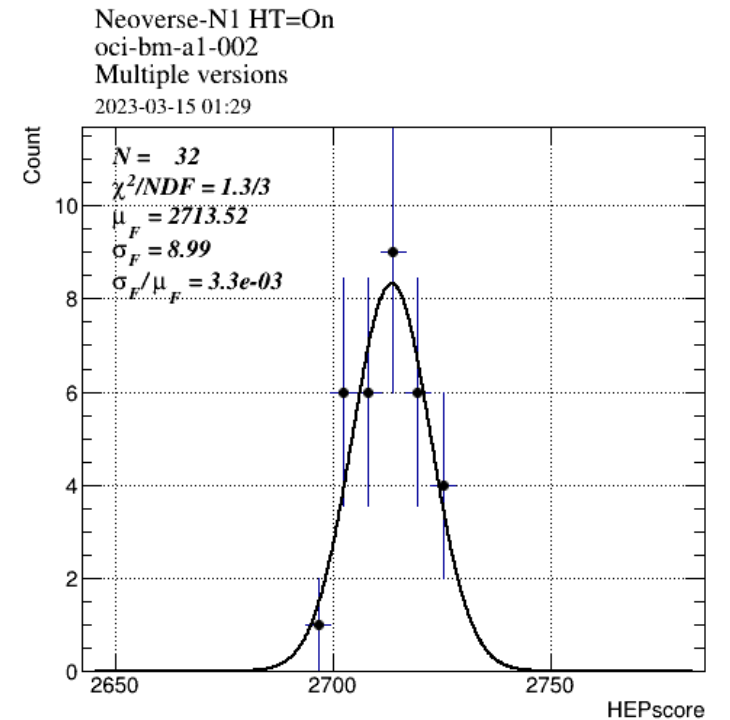
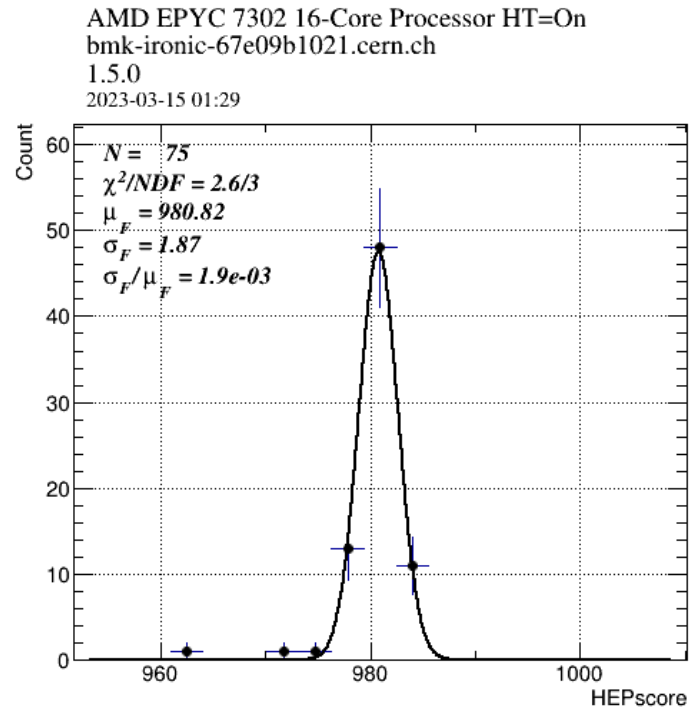
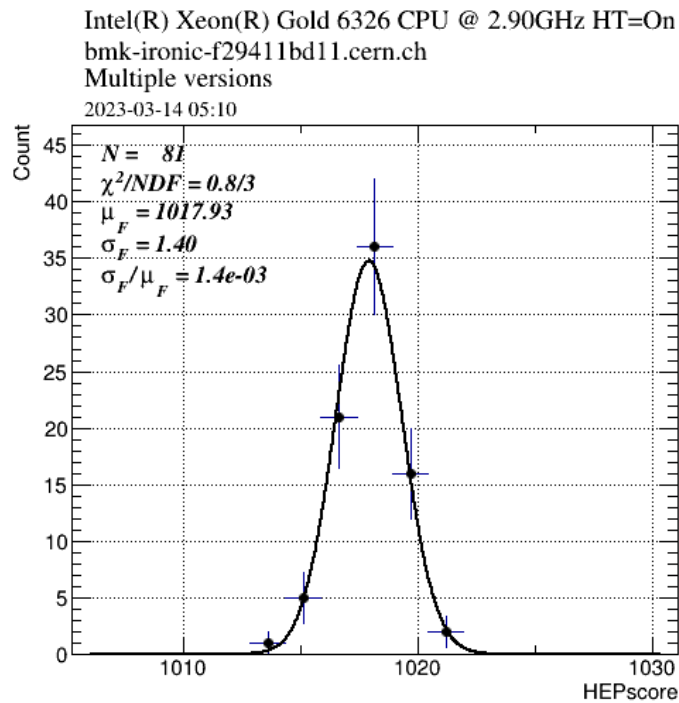
Presented by Randall Sobie

HEPscore workloads



HEPscore23

- HEPscore computed for various CPU models and brands—Intel, AMD, ARM



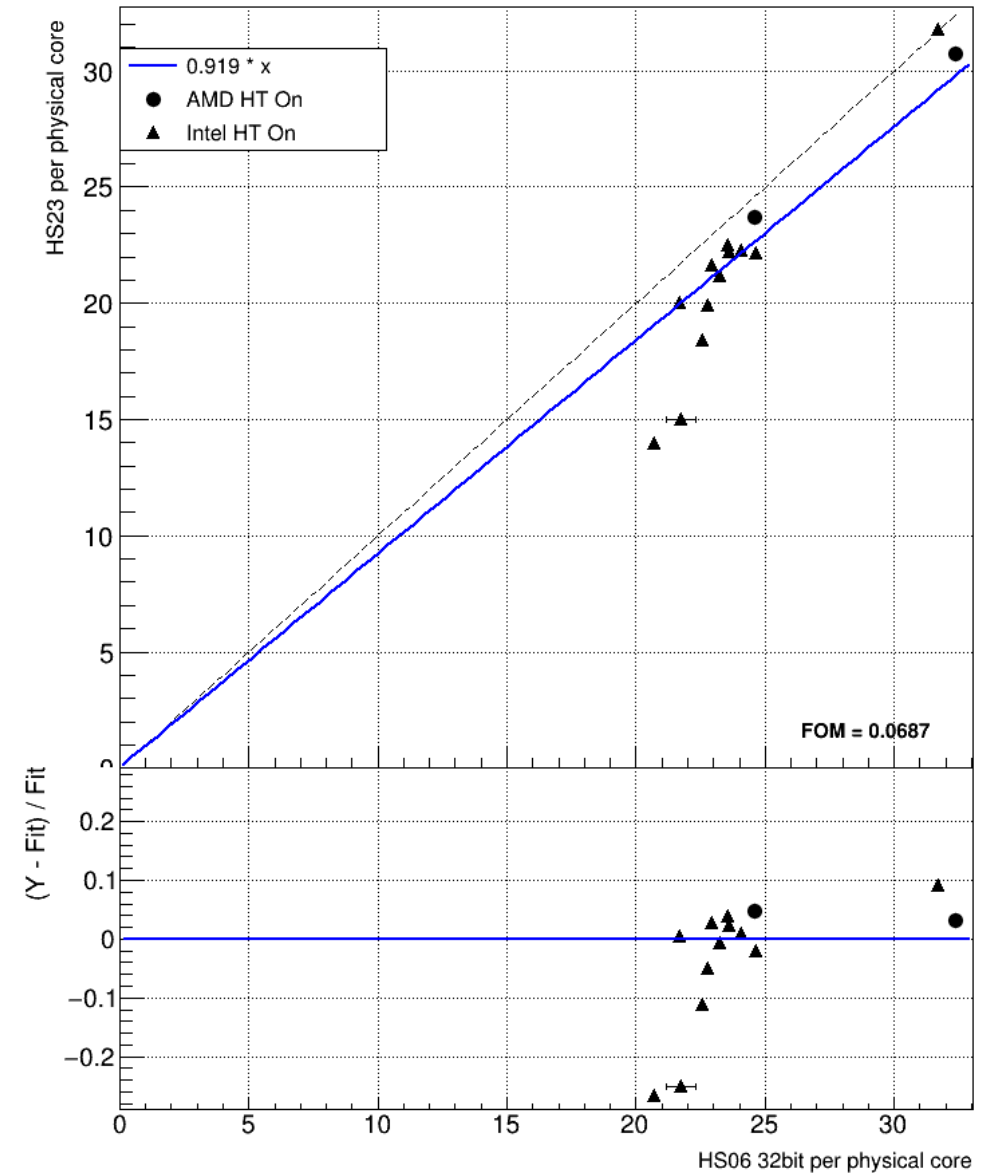
HS06 32bit vs HS23

- ❑ Correlating the score of CPU models between HS06 and HS23
- ❑ HS23 gives slightly lower scores in comparison to HS06 32bit

$$\text{HS23} = 0.918 \times \text{HS06}$$

- ❑ Relative discrepancy $\lesssim 26\%$
 - Mostly $\lesssim 12\%$

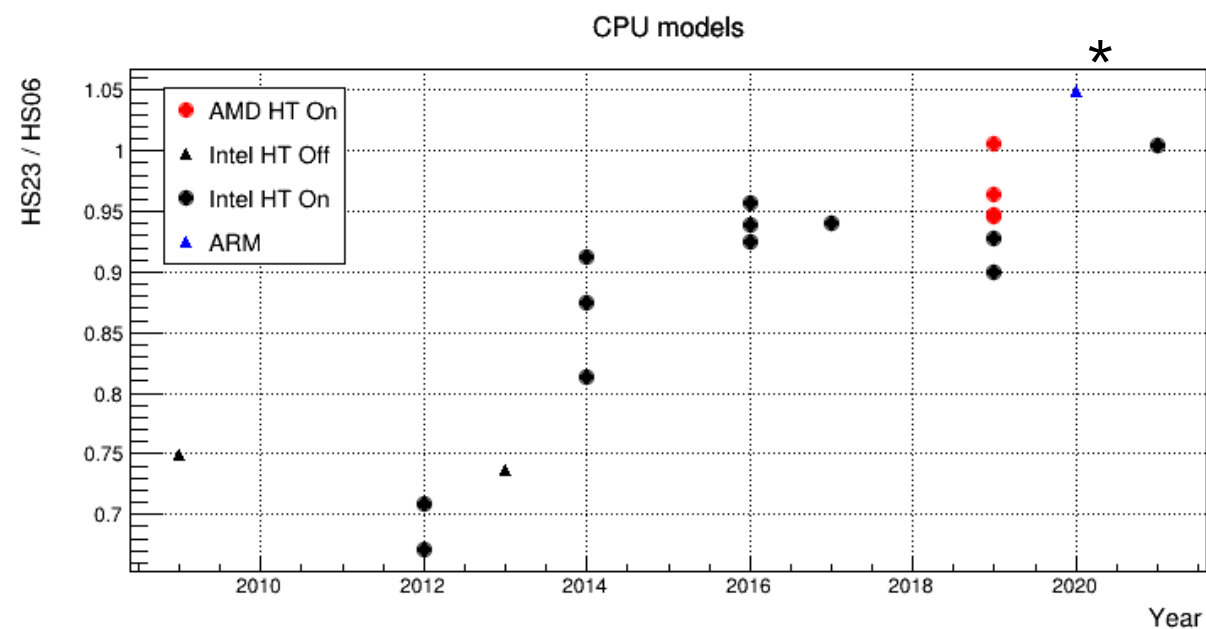
HS06 32bit vs HS23
2023-03-15 01:36



CPU Model release years vs HS23/HS06

- Older the CPU model, the larger the discrepancy between HS23 and HS06

CPU Model	Site	SMT_Enabled	HS06	HS06 std	HS23	HS23 std	HS23/HS06	Year
Neoverse-N1	CERN	0	2928.83	559.22	2713.75	7.57	1.05	2020
AMD EPYC 7742 64-Core Processor	GridKa	1	2925.61	73.63	2944.49	10.54	1.01	2019
Intel(R) Xeon(R) Gold 6326 CPU @ 2.90GHz	CERN	1	1014.10	2.55	1018.07	2.44	1.00	2021
AMD EPYC 7452 32-Core Processor	PIC	1	1573.55	6.83	1516.77	4.71	0.96	2019
Intel(R) Xeon(R) CPU E5-2680 v4 @ 2.40GHz	CERN	1	659.85	1.97	631.13	4.29	0.96	2016
AMD EPYC 7302 16-Core Processor	CERN	1	1036.27	2.26	981.46	4.72	0.95	2019
AMD EPYC 7702 64-Core Processor	GridKa	1	2691.20	46.93	2545.91	4.99	0.95	2019
Intel(R) Xeon(R) Gold 6130 CPU @ 2.10GHz	CERN	1	734.61	2.15	690.27	5.56	0.94	2017
Intel(R) Xeon(R) CPU E5-2680 v4 @ 2.40GHz	PIC	1	661.91	1.93	621.69	2.86	0.94	2016
Intel(R) Xeon(R) Silver 4216 CPU @ 2.10GHz	CERN	1	769.76	1.32	714.45	3.62	0.93	2019
Intel(R) Xeon(R) CPU E5-2650 v4 @ 2.20GHz	CERN	1	521.14	0.97	481.99	2.37	0.92	2016
Intel(R) Xeon(R) CPU E5-2640 v3 @ 2.60GHz	PIC	1	371.89	1.21	339.51	1.59	0.91	2014
Intel(R) Xeon(R) Gold 5218 CPU @ 2.30GHz	CERN	1	788.18	1.49	708.95	1.01	0.90	2019
Intel(R) Xeon(R) CPU E5-2630 v3 @ 2.40GHz	CERN	1	364.59	0.69	319.02	2.21	0.88	2014
	GridKa	1	361.43	0.81	293.82	2.87	0.81	2014
Intel(R) Xeon(R) CPU E5520 @ 2.27GHz	IN2P3-SUBATECH	0	105.86	0.49	79.36	0.88	0.75	2009
Intel Core Processor (Haswell, no TSX, IBRS)	NDGF-T1	0	403.79	10.22	297.39	NaN	0.74	2013
Intel(R) Xeon(R) CPU E5-2670 0 @ 2.60GHz	GridKa	0	282.61	1.28	200.81	2.19	0.71	2012
		1	337.78	8.53	239.32	1.03	0.71	2012
Intel(R) Xeon(R) CPU E5-2665 0 @ 2.40GHz	GridKa	1	332.09	1.59	222.93	1.34	0.67	2012



* HS06 for ARM is 64bit → compensated by a factor of 1.13 (HS06 64bit = 1.13 × HS06 32bit)

