



TOPIC 3 – FORSCHUNGSZENTRUM JÜLICH

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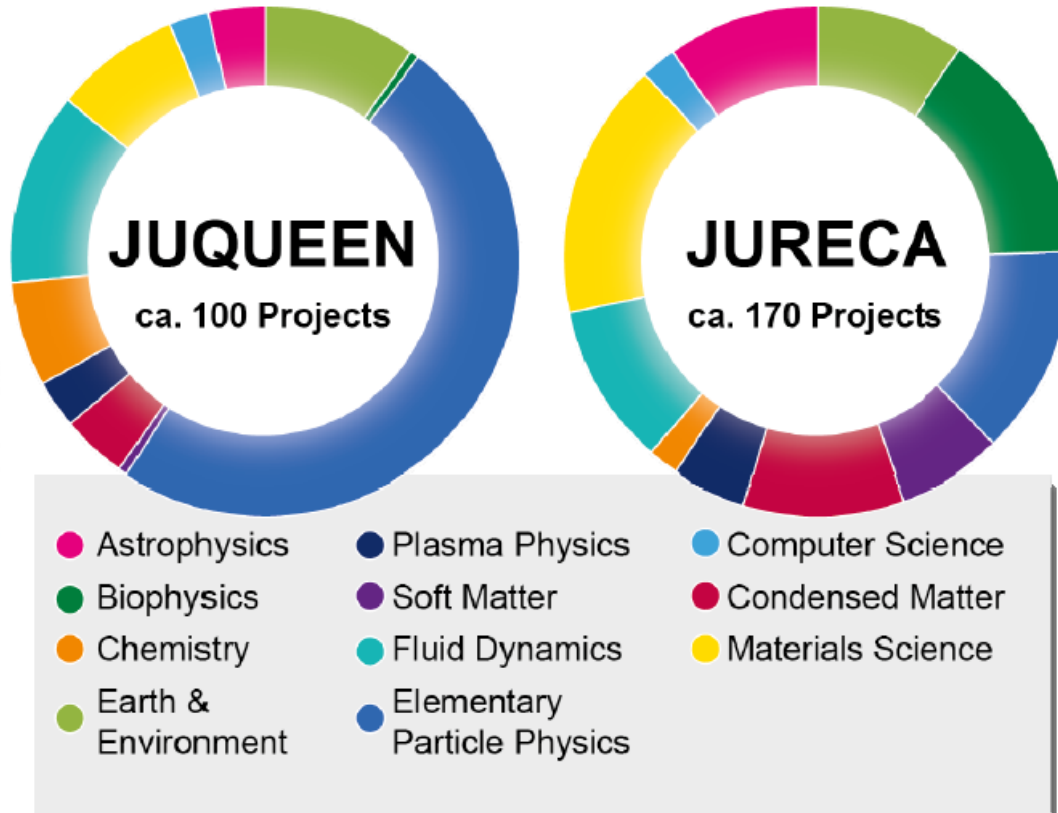
FUTURE COMPUTE REQUIREMENTS

US Exascale Requirements Review Report

Computational Task	Current Usage	2025 Usage	Current Storage (Disk)	2025 Storage (Disk)	2025 Network Requirements (WAN)
Accelerator Modeling	~ 10M – 100M core-hrs/yr	~ 10G – 100G core-hrs/yr			
Computational Cosmology	~ 100M – 1G core-hrs/yr	~ 100G – 1000G core-hrs/yr	~10PB	>100PB	300Gb/s (burst)
Lattice QCD	~1G core-hrs/yr	~ 100G – 1000G core-hrs/yr	~1PB	>10PB	
Theory	~ 1M – 10M core-hrs/yr	~ 100M – 1G core-hrs/yr			
Cosmic Frontier Experiments	~ 10M – 100M core-hrs/yr	~ 1G – 10G core-hrs/yr	~1PB	10 – 100PB	
Energy Frontier Experiments	~ 100M core-hrs/yr	~ 10G – 100G core-hrs/yr	~1PB	>100PB	300Gb/s
Intensity Frontier Experiments	~ 10M core-hrs/yr	~ 100M – 1G core-hrs/yr	~1PB	10 – 100PB	300Gb/s

HEP & HPC

Recent stats



Target	Site	Cycles
Muon g-2 (HVP)	ALCC	220 Mch
PDFs	ALCC	50 Mch
USQCD	ALCC OLCF	444 Mch
Hadron structure	ALCC OLCF	150 Mch

Data footprint
ca. 15 PByte

HPC DEVELOPMENT

Future challenges

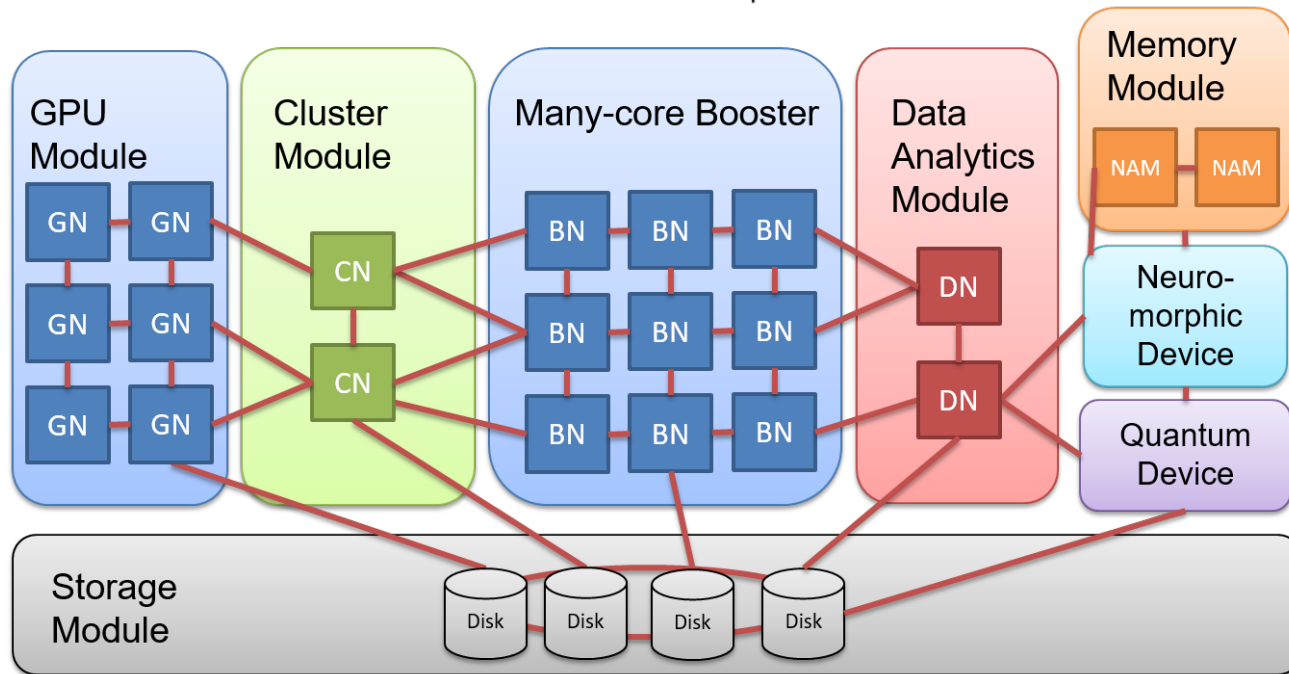
- Increasingly complex architectures
- Focus on integrating



a) JURECA Cluster



b) JURECA Booster



c) JUWELS Cluster

PLÄNE

Topics 3, B, C

- Community codes:
Chrome, qlua, Grid, openQCD, tmlqcd, etc.
 - Extended stacks complicated to compile
 - Long built time, large number of parameters
 - Tuned libraries, eg. QUDA, QPhiX
 - Expert knowledge even before production
 - AIM: on-site expert to develop, maintain, & verify the stacks and disseminate knowledge
- Topic 3: development of software
- Topic C: contribute to workshops, hands-on sessions and hackathons (dissemination)
- Topic 3 or B?: provide access to the stack on the systems (modules/containers)

Chroma	CPS	FUEL	MILC	QLUA
Inverter	MDWF	QOPQDP	QUDA	
QDP++	QDP	QIO		
QLA	QMP	QMT		