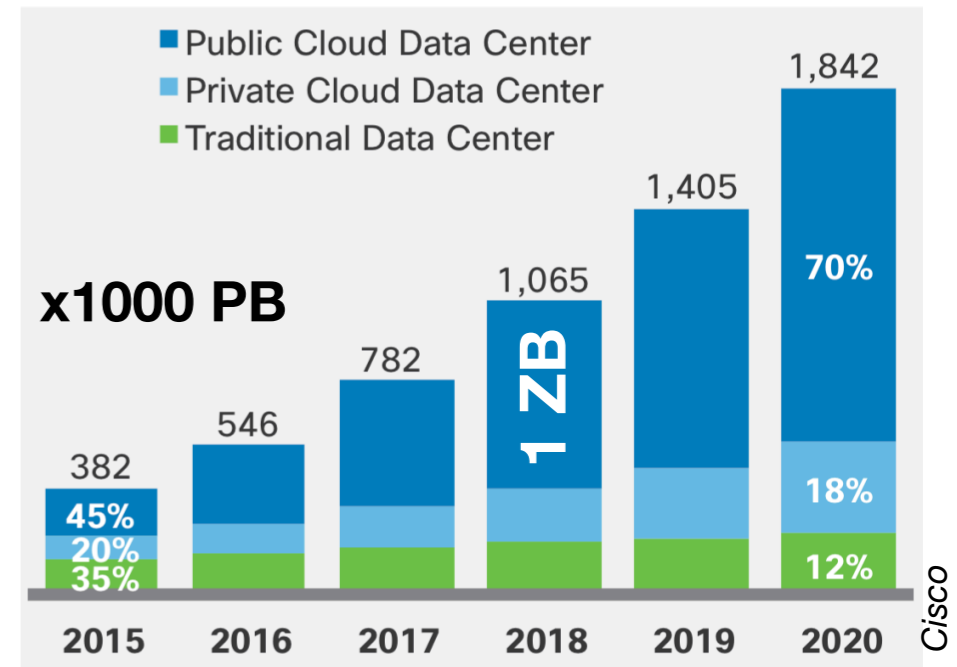
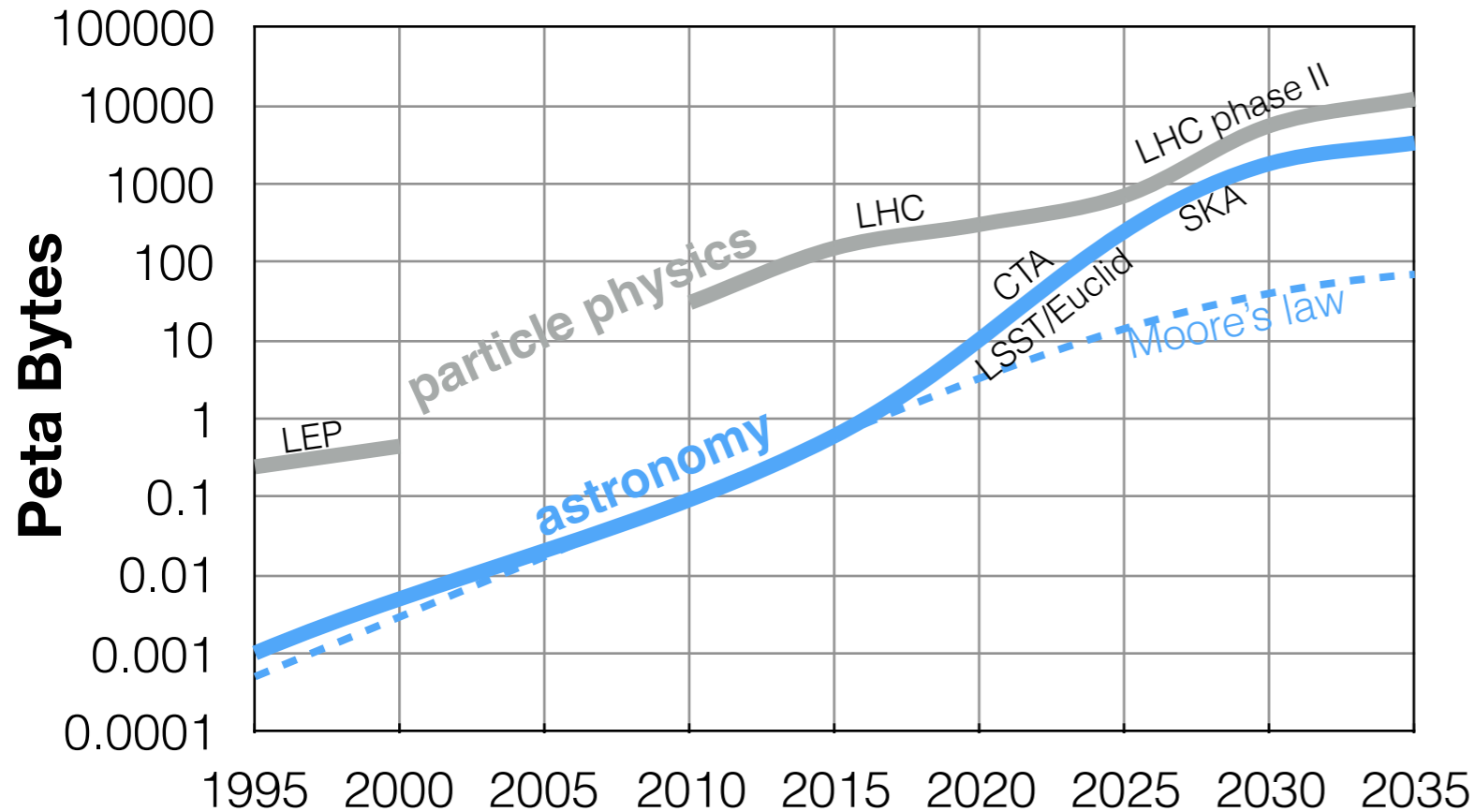


Overview



Traditional data centres → ← Centralised ("cloud")

A centralisation of data is taking place.

Providing access means providing computing.

App/PP ~ 3% in 2018

App/PP ~ 7% in 2021

App/PP ~ 10% in 2024



Cisco

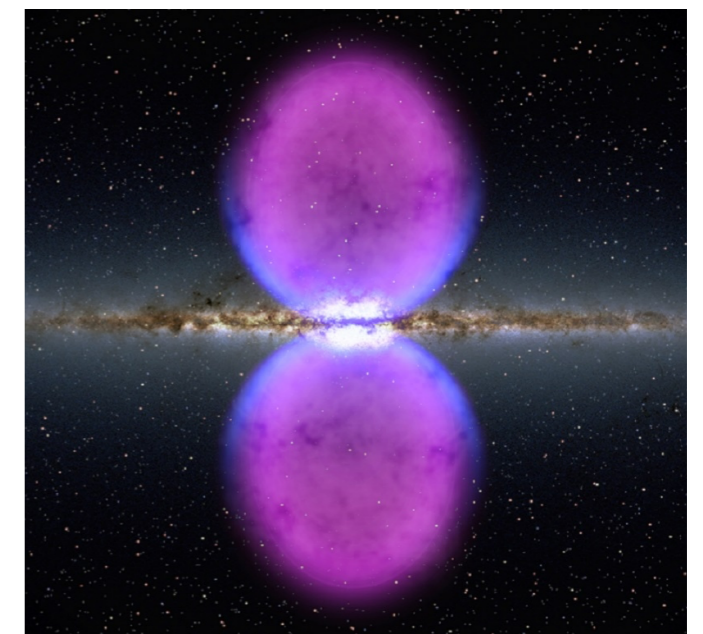
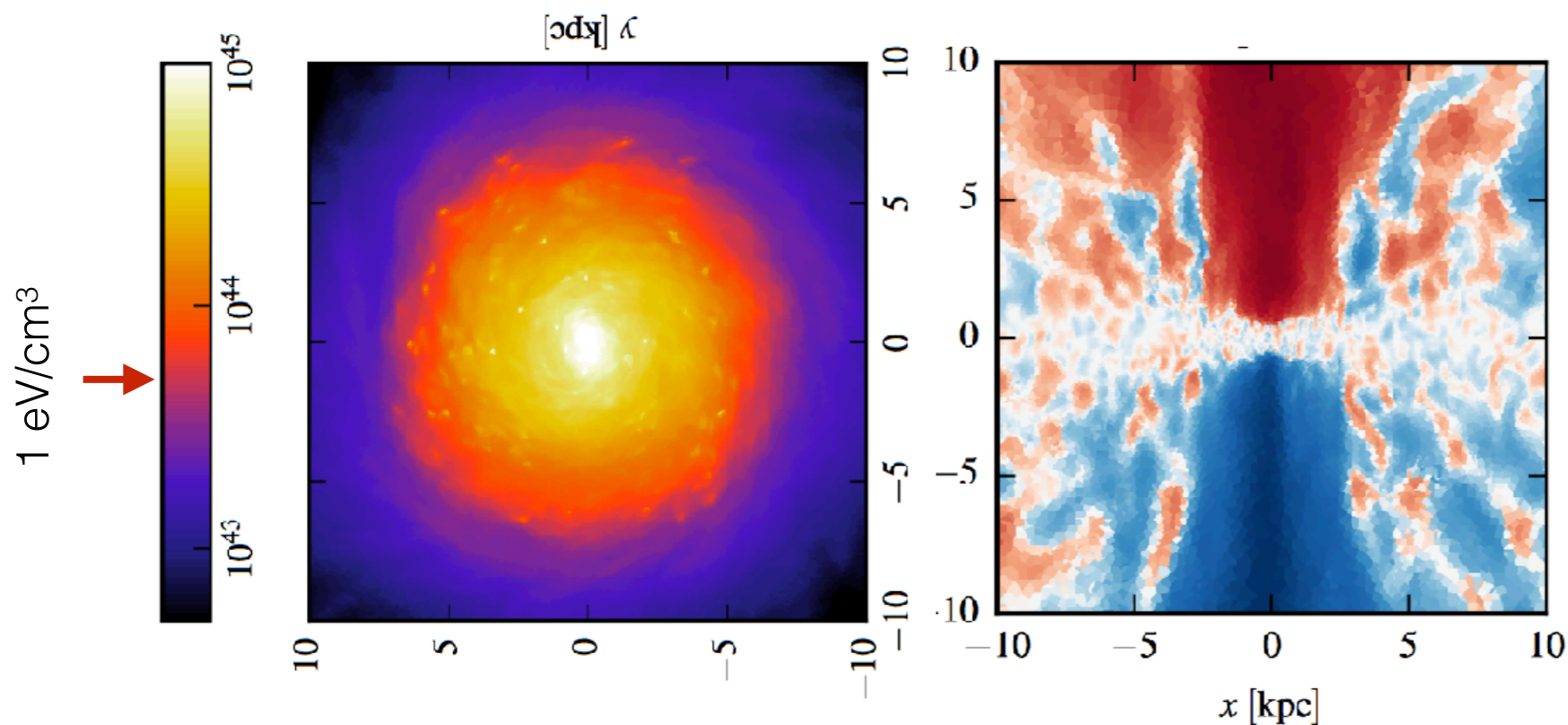
Overview

Domain	Experiments	PB / year	Start	Multi messenger	CHIPP
γ-rays (ground)	CTA	10	2020	✓	✓
GW (ground)	Einstein Telescope	1	>2025	✓	✓
DM (infrared/optical)	Euclid/LSST	1	2021/2021	✓	✓
γ-rays (space)	Polar, eXTP, e-Astrogam	0.1	2017/2025/>2029	✓	✓
CR (space)	DAMPE, HERD, PAN	0.1	2015/>2025		✓
CMB	COrE+++	0.01	>2032		✓
DM (noble gas)	Xenon 50T/Argon 300T	0.01			✓
GW (space)	LISA	10^{-4}	2034	✓	✓
High-energy ν	KM3Net	1		✓	-
CR	AugerPrime			✓	-

The case of CTA

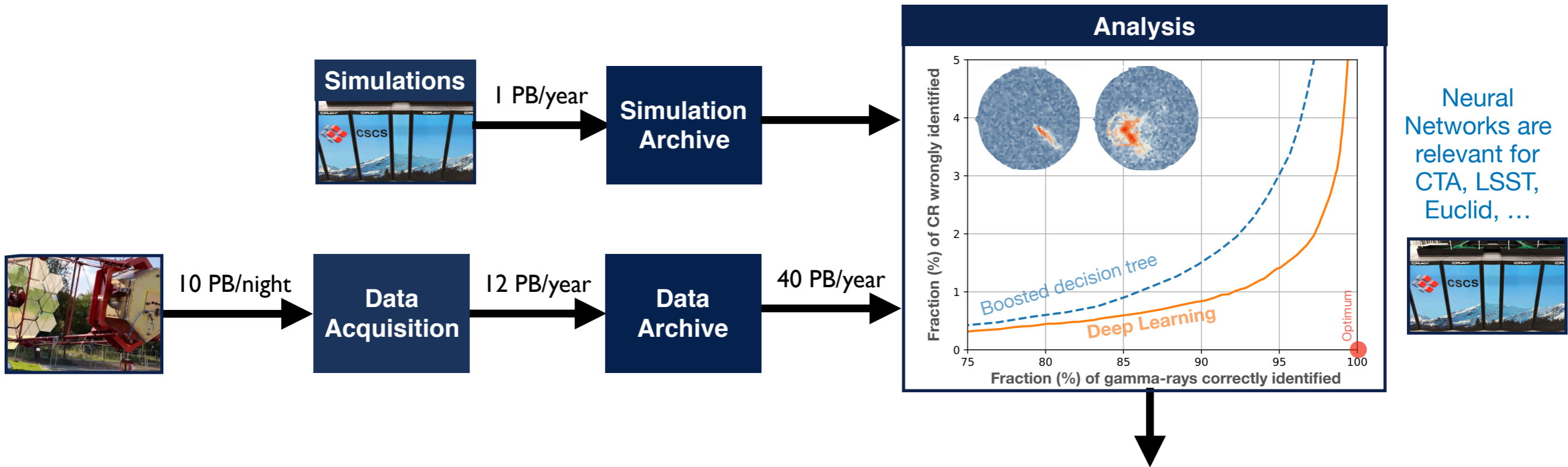
Quenching of stellar formation is necessary to understand the structural evolution of galaxies and of the Universe. This is explained by **FEEDBACK**:

- The activity of black holes can affect their host galaxies. Whether and how they do so is an open question.
- The growing energy density of Cosmic-Ray at the center of galaxies can expel strong galactic winds and limit stellar formation. *Origin of galactic CR.*

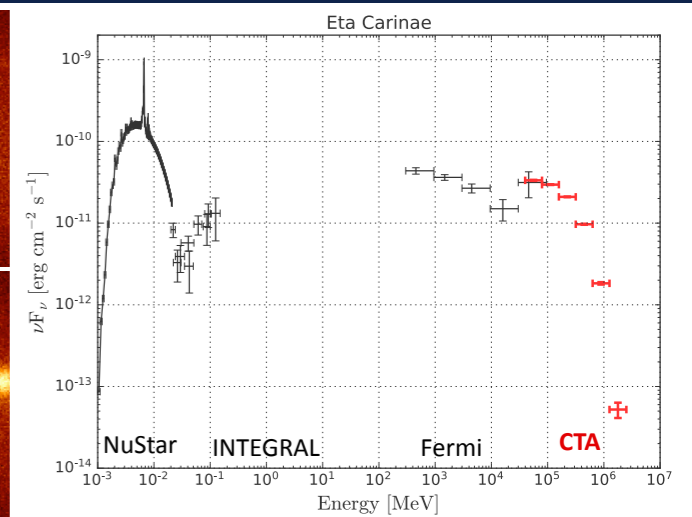
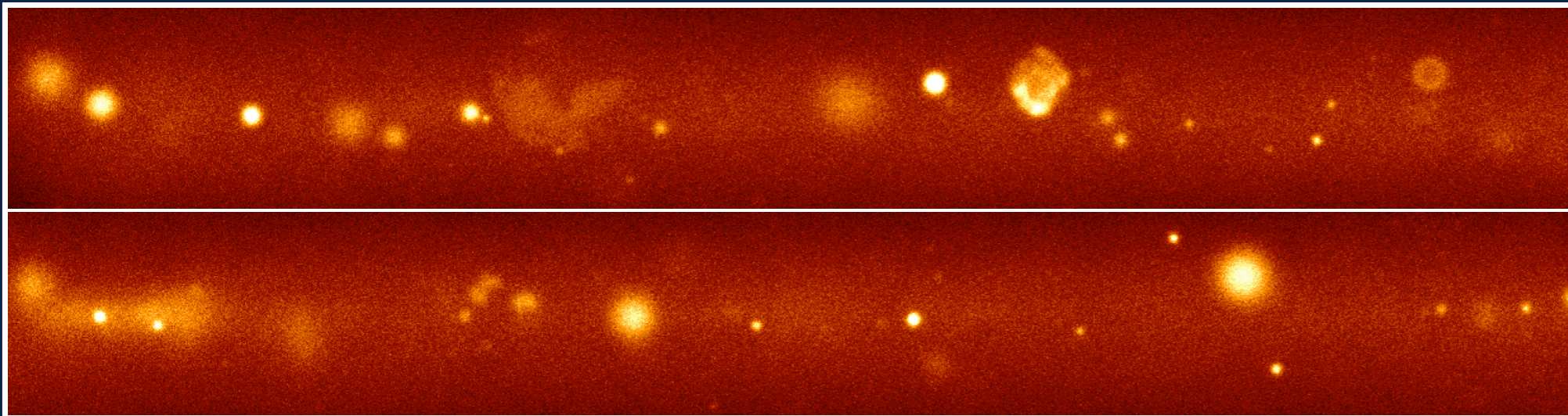


Fermi Bubbles

The case of CTA



Science



Is stellar activity responsible for the CR density of the galaxy ?

Answering requires analysing CTA data on the full galactic plane

The case of CTA

	Unit	2018	2019	2020	2021	2022	2023	2024
STORAGE								
Tape Simulations (PB)	PB	1	1	1	1	1	1	1
Tape Data (PB)	PB	0.7	0.9	1.5	3	6	9	12
Scratch disk (PB)	PB	0.07	0.09	0.15	0.3	0.6	0.9	1.2
		Indicative numbers						
PROCESSING								
Simulations	Core-Year	1000	1000	1000	1000	1000	1000	1000
Data Processing	Core-Year	100	129	214	429	857	1286	1714
Data Processing	GPU-Year	1	2	3	6	12	18	24

LHC Grid

Dedicated
Data Centres

+ ML learning, analysis improvements, reprocessing and scientific analysis

	Unit	2014	2015	2016	2017	2018	2019	TOTAL
SIMULATIONS								
CH	MHS06-hours	0	0	0	0	26	26	53
D	MHS06-hours	83	100	36	36	36	36	327
F	MHS06-hours	65	47	30	30	30	30	232
I	MHS06-hours	3	24	11	11	11	11	71
PL	MHS06-hours	16	16	12	12	12	12	80
...	MHS06-hours	10	10	10	10	10	10	60

~300 Core-Year
~4% of CHIPP
ressources

Plus storage

Suggestions for CHIPP computing

- **CHIPP could allocate a small fraction (4→10%) of its computing to App (even before App experiments start)**
- **The need of App go beyond the Grid (e.g. GPUs, data access (anyway the grid was invented to solve an old problem)**
- **Coordination of computing could be discussed with astrophysics (e.g. simulations on LHC grid, analysis on Astro Data Centre, GPU at CSCS)**

