

Particle/Astroparticle Physics Activities

by the CHIPP members

Presentation to the FLARE panel

Bern, 29 January 2018

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CHIPP Chair



CHIPP three scientific pillars remain as

- Pillar-1: Experiments with energy and intensity frontier machines: direct and indirect search for new physics

Experiments at CERN and PSI

- Pillar-2: Experiments with neutrinos: measurements of neutrino properties and oscillation parameters

US/JP ν beam experiments and $0\nu 2\beta$ experiments

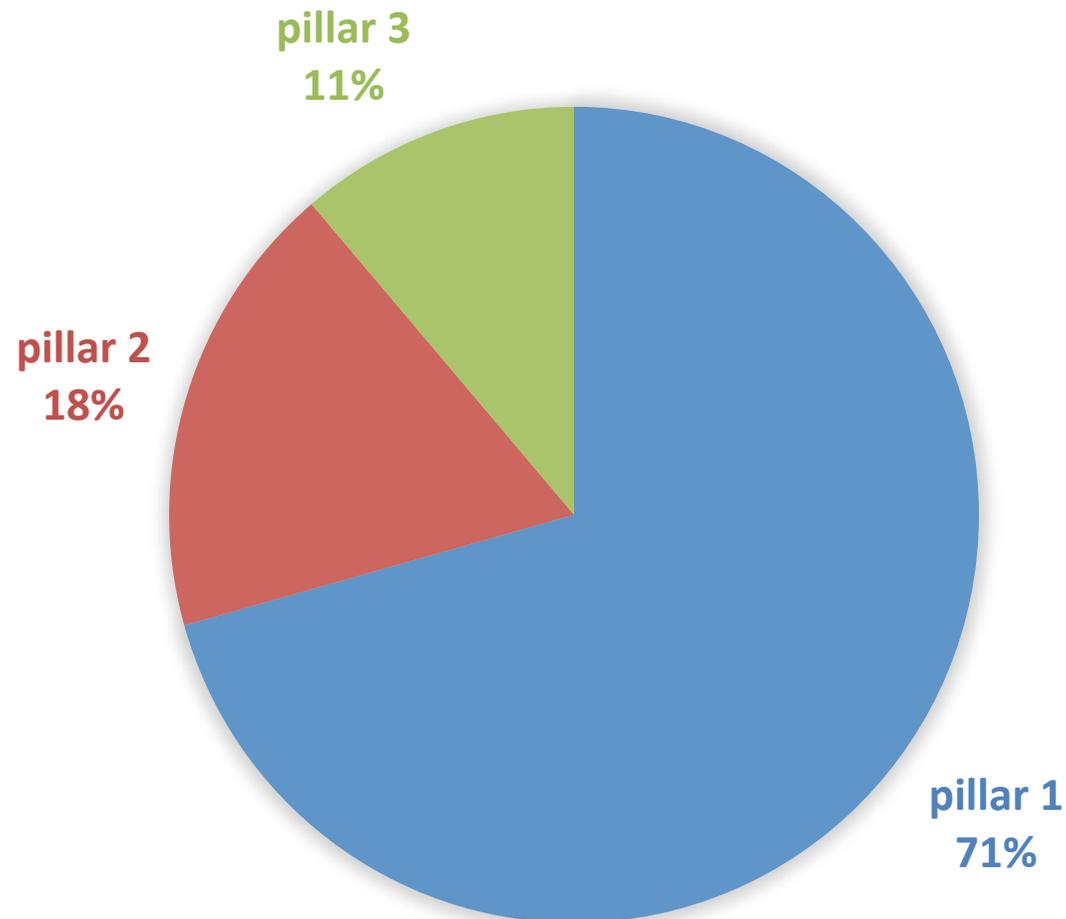
- Pillar-3: Astroparticle physics experiments: dark matter and dark energy, high energy cosmic particles, ...

Dark matter experiments and Cherenkov telescopes

People involved in the three pillars

- Fractions of the senior FTEs for the three pillars

**TOTAL CHIPP PROF+SENIOR FTE
(2019-20)**



Current major long term programmes

- Pillar 1
 - LHC experiments: ATLAS (UniBE, UniGE), CMS (ETHZ, PSI, UniZH) and LHCb (EPFL, UniZH)
 - PSI experiments: nEDM (ETHZ, PSI, UniBE), Mu3e (UniGE, ETHZ, PSI, UniZH)
 - Swiss Centre for Accelerator Research and Technology (EPFL, ETHZ, GE, PSI) now with a special funding from SERI + CERN
- Pillar 2
 - Accelerator based ν : long and short baseline oscillation experiments T2K (UniBE, ETHZ, UniGE) and Phase 2 (ETHZ, UniGE) in Japan → Hyper-K
Liq. Ar detector R&D for DUNE in US (UniBE, ETHZ) → DUNE
MicroBooNE and SBND in US (UniBE)
 - $0\nu 2\beta$: GERDA → LEGEND (UniZH)
- Pillar 3
 - Dark matter: XENON (UniZH) → XENON-nt (UniZH) → DARWIN
 - Cosmic ν : IceCube (GE) → upgrade
 - High energy γ rays: CTA (ETHZ, GE, ZH) now with special funding from SERI
- ⇒ Consistent with the ApPEC, CERN and NuPECC strategy planning

FLARE for 2017-2020 (I)

- Already approved for the full four year period
 - Pillar 1:
 - M&O LHC experiments,
ATLAS and LHCb
 - already approved for the full 2017-2020 period

FLARE for 2017-2020 (II)

- Pillar 1: 2019-2020 request

- LHC

- CMS, LHC Computing (for ATLAS, CMS and LHCb)

- High intensity (PSI ultra-cold neutron T-violation and CERN SPS search for very weakly interacting particle)
nEDM, NA64

- Pillar 2: 2019-2020 request

- Neutrino properties ($0\nu 2\beta$ decays)

- GERDA/LEGEND

- Neutrino oscillations (long baseline ν oscillations)

- NA61/T2K-Phase 2/NP05 @ JP, DUNE-R&D and DUNE @ US

- Pillar 3: 2019-2020 request

- Dark matter search (Xe and solid state detector)

- XENON(-nT), DAMIC

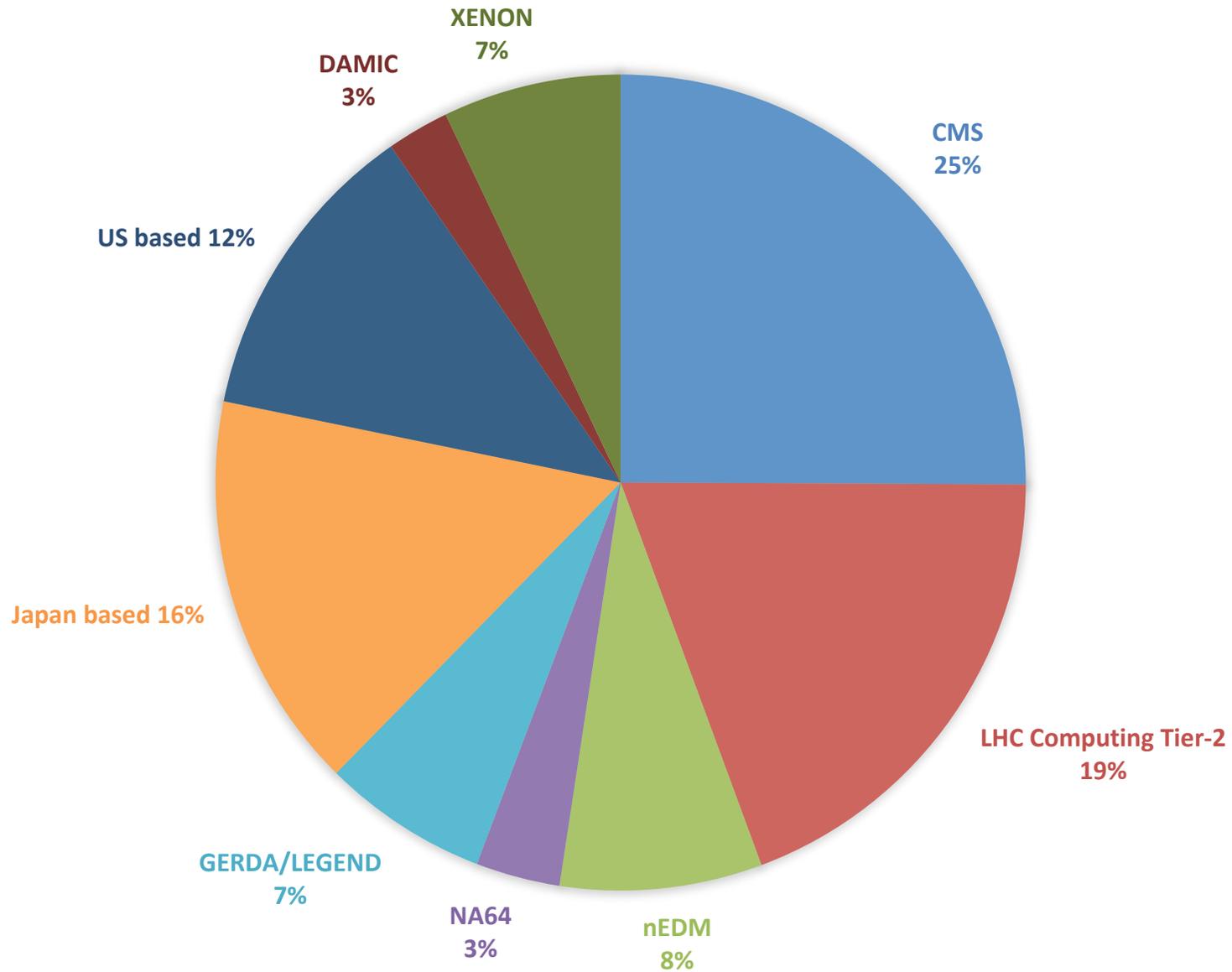
FLARE for 2017-2020 (III)

- Table for the 2019-2020 requests (in kCHF)

Pillar	Project	2019	2020
Pillar 1	CMS	1,150	1,150
Pillar 1	LHC Computing Tier-2	849	919
Pillar 1	nEDM	370	370
Pillar 1	NA64	161	147
Pillar 1 SUB TOTAL		2,530	2,586
Pillar 2	GERDA/LEGEND	304	303
Pillar 2	JP based	805	645
Pillar 2	US based	900	220
Pillar 2 SUB TOTAL		2,009	1,168
Pillar 3	DAMIC	143	85
Pillar 3	XENON	348	304
Pillar 3 SUB TOTAL		492	388
TOTAL Requested		5,030	4,142

FLARE for 2017-2020 (III)

FLARE REQUESTS 2019-2020 PER EXPERIMENT



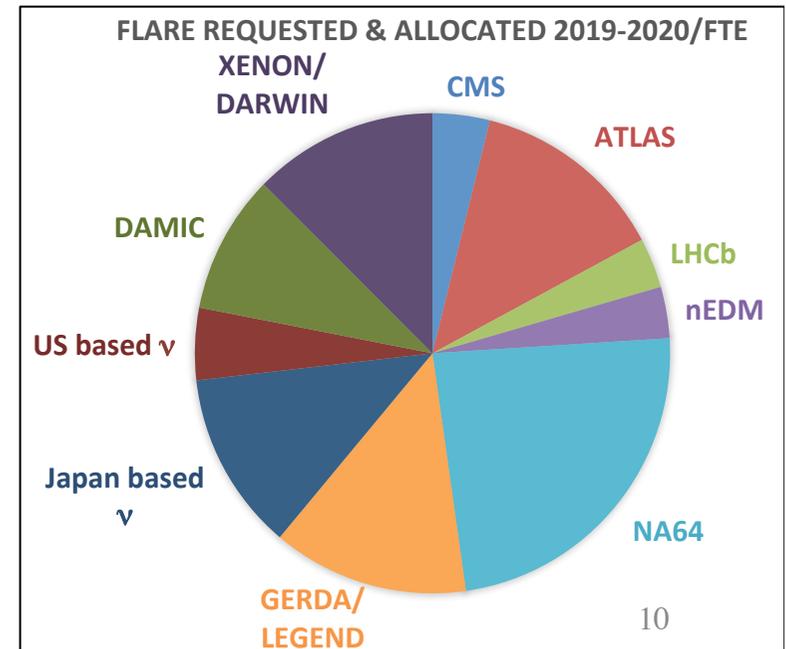
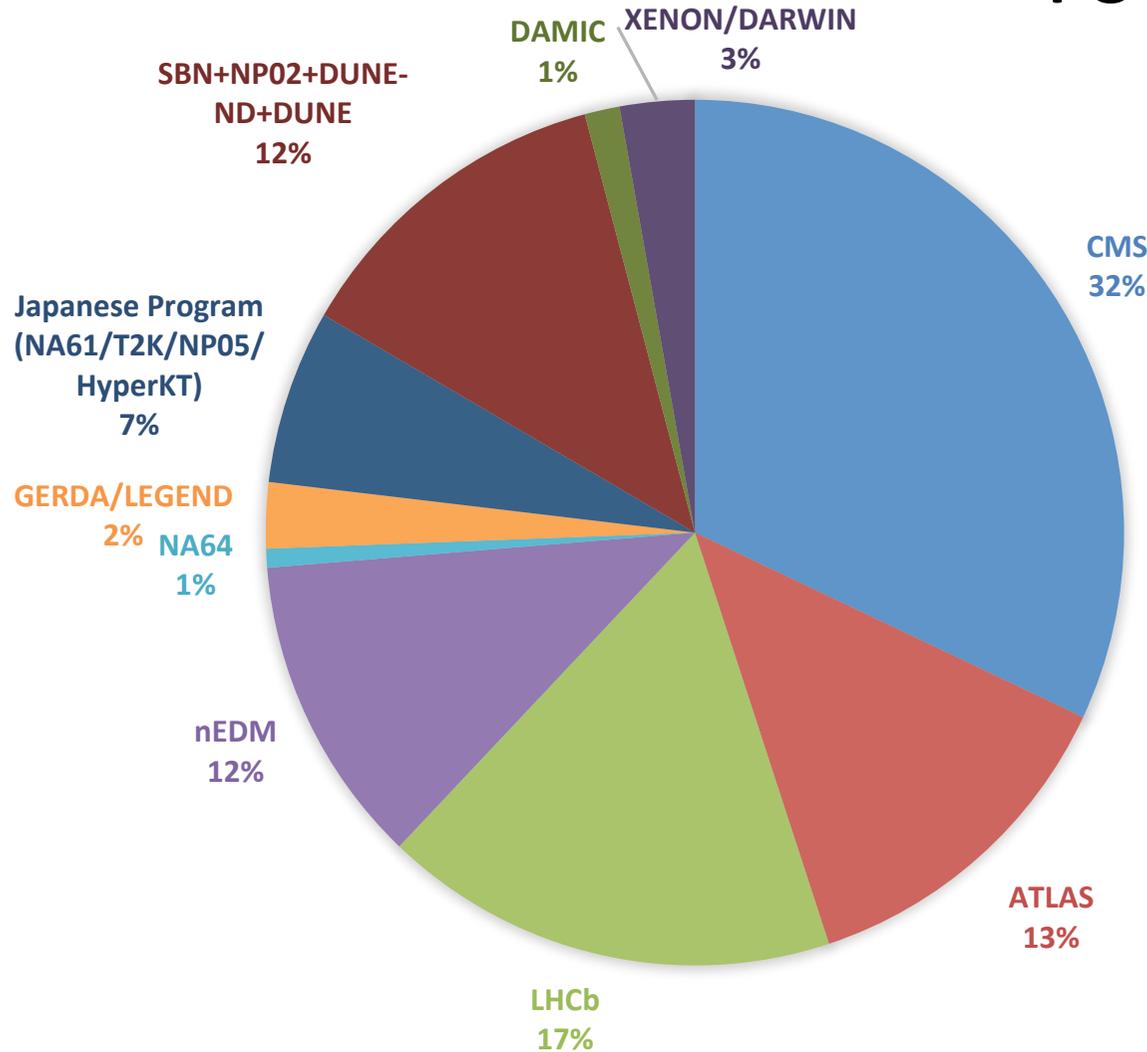
For the priority consideration (I)

- **Scientific validation** is basically done by the laboratory's scientific committees (CERN, FNAL, J-PARC, LNGS, PSI, ...) and approval of the corresponding SNSF grants
- **MoU commitments** need to be honored, i.e. M&O for the LHC experiments and LHC Computing Tier-2
- Taking into account the FLARE motivation “for **major international experiments**” and the strength of the Swiss participation
- Attention for the required **spending profile**, for example, different upgrade schedules for the three LHC experiments
- **Exploiting and completing the projects** with considerable CH effort and investments already made

For the priority consideration (II)

TOTAL PROF+SENIOR FTE PER EXPERIMENT
(2019-20)

Total 57 FTE



CHIPP coordination effort

- **White Papers** for astroparticle physics (Pillar 3) **in 2013**, neutrino physics (Pillar 2) **in 2015** and high energy & precision physics (Pillar 1) **2018**
- **CHIPP Roadmap** will be updated in 2019
- **Continuous effort to compile and consolidate** project funding requirements **through the community discussion** to a reasonable level.

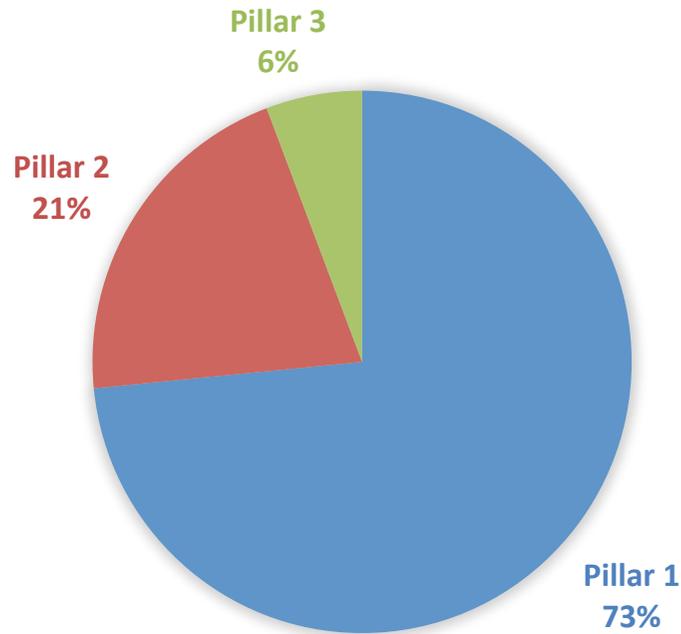
NB: FLARE: 2019-2020

Available: 10.322 MCH

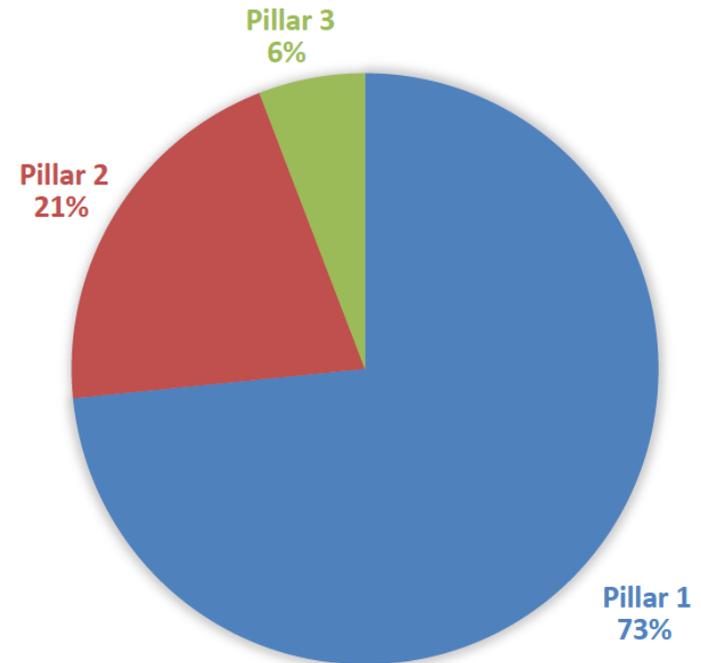
CHIPP programme requested: 9.173 MCH

CHIPP Global picture 2017-2020

FLARE ALLOCATED+REQUESTED
FOR 2019-2020



FLARE ALLOCATED+REQUESTED
FOR 2017-2020



Recall Senior-FTE

Pillar 1 : Pillar2 : Pillar3 = 71% : 18% : 11%