

Particle/Astroparticle Physics Activities  
by the CHIPP members  
Presentation to the FLARE panel  
Bern, 29 January 2018

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# 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  $\nu$  beam experiments and  $0\nu 2\beta$  experiments*

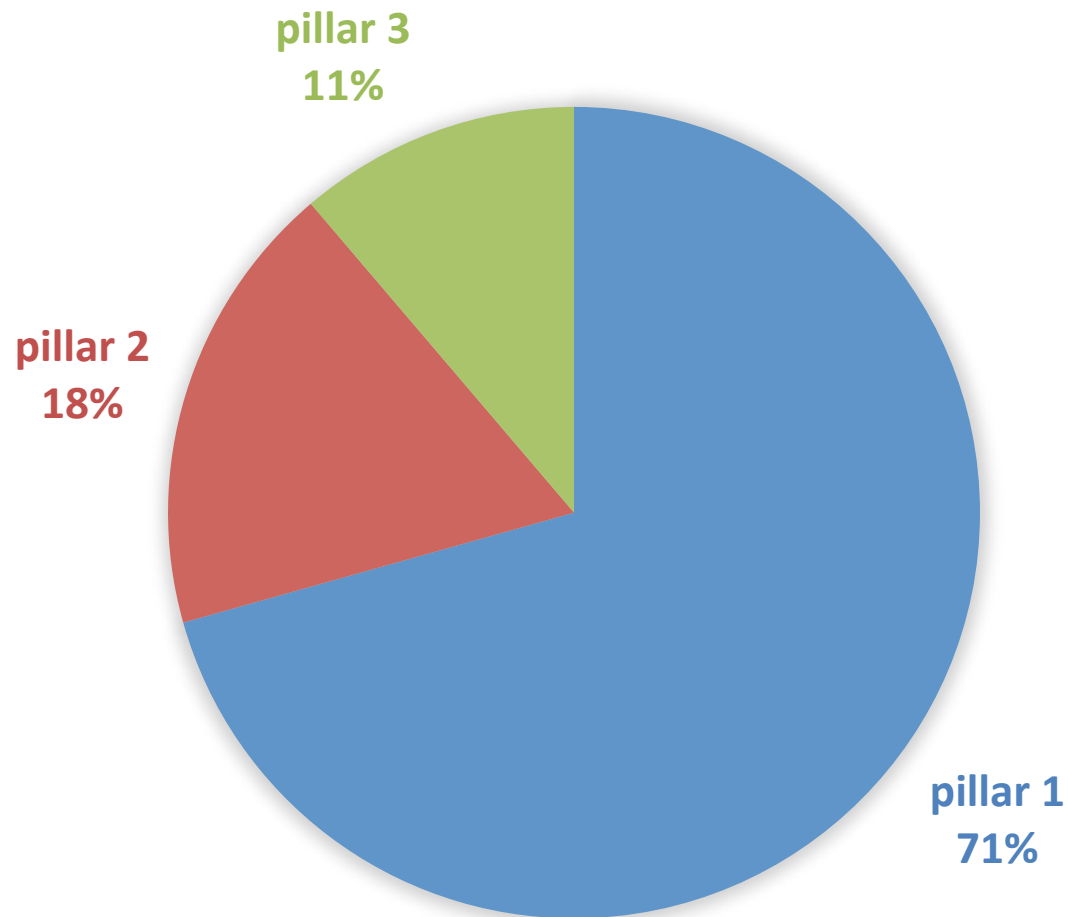
- Pillar-3: Astroparticle physics experiments: dark matter and dark energy, high energy cosmic particles, ...

*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  $\nu$ : 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  $\nu$ : IceCube (GE) → upgrade
  - High energy  $\gamma$  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  $\nu$  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

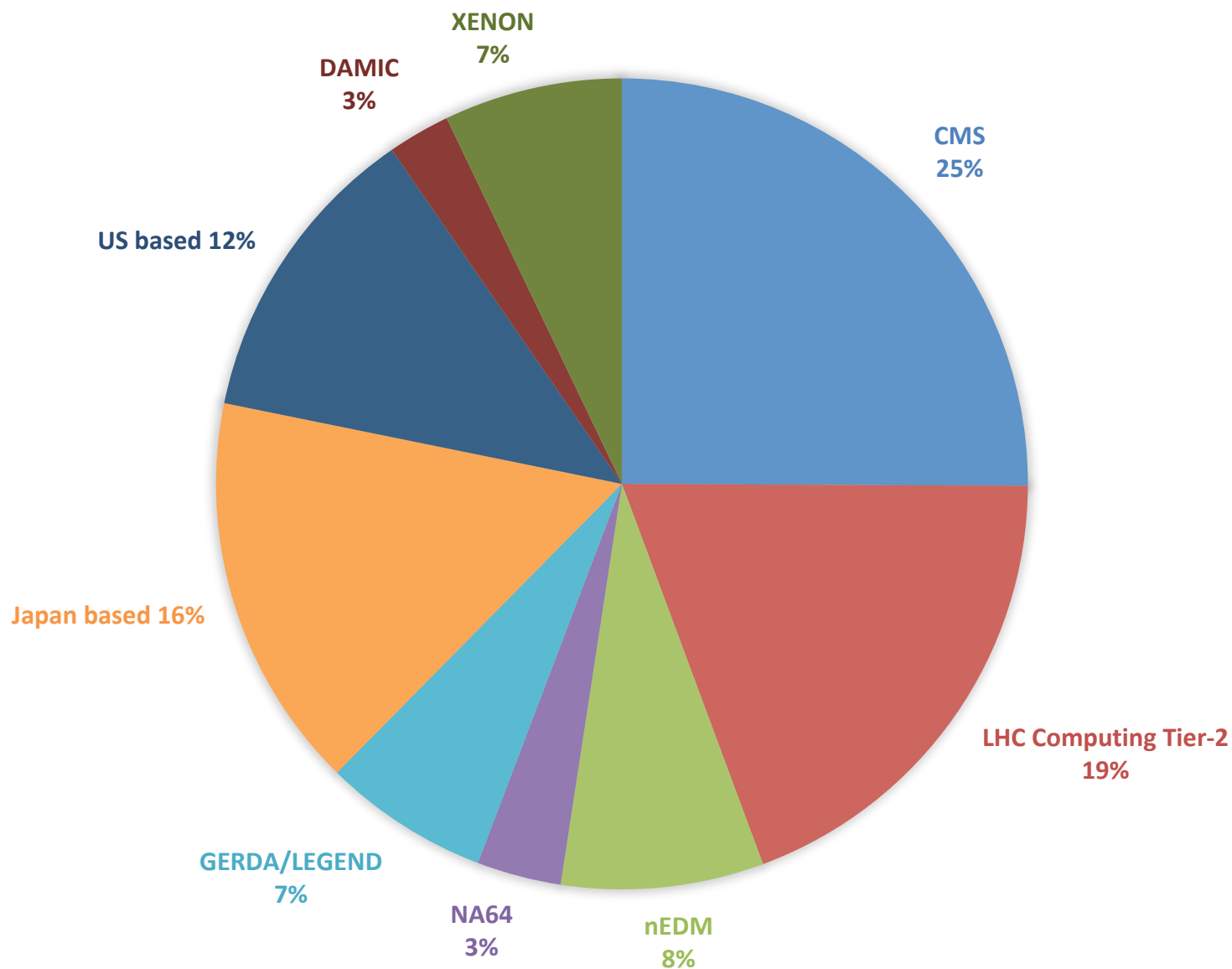
# FLARE for 2017-2020 (III)

- 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
<b>Pillar 1 SUB TOTAL</b>		<b>2,530</b>	<b>2,586</b>
Pillar 2	GERDA/LEGEND	304	303
Pillar 2	JP based	805	645
Pillar 2	US based	900	220
<b>Pillar 2 SUB TOTAL</b>		<b>2,009</b>	<b>1,168</b>
Pillar 3	DAMIC	143	85
Pillar 3	XENON	348	304
<b>Pillar 3 SUB TOTAL</b>		<b>492</b>	<b>388</b>
<b>TOTAL Requested</b>		<b>5,030</b>	<b>4,142</b>

# FLARE for 2017-2020 (III)

## FLARE REQUESTS 2019-2020 PER EXPERIMENT





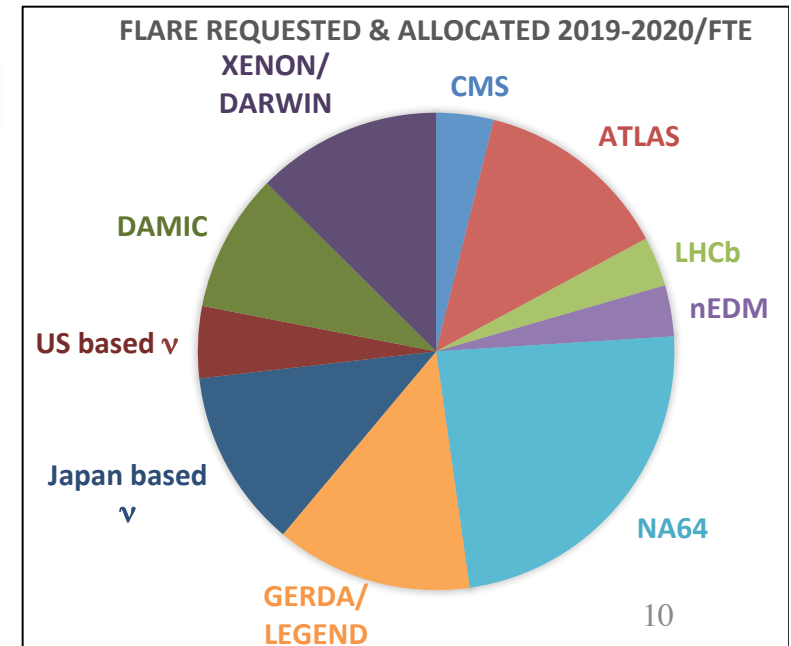
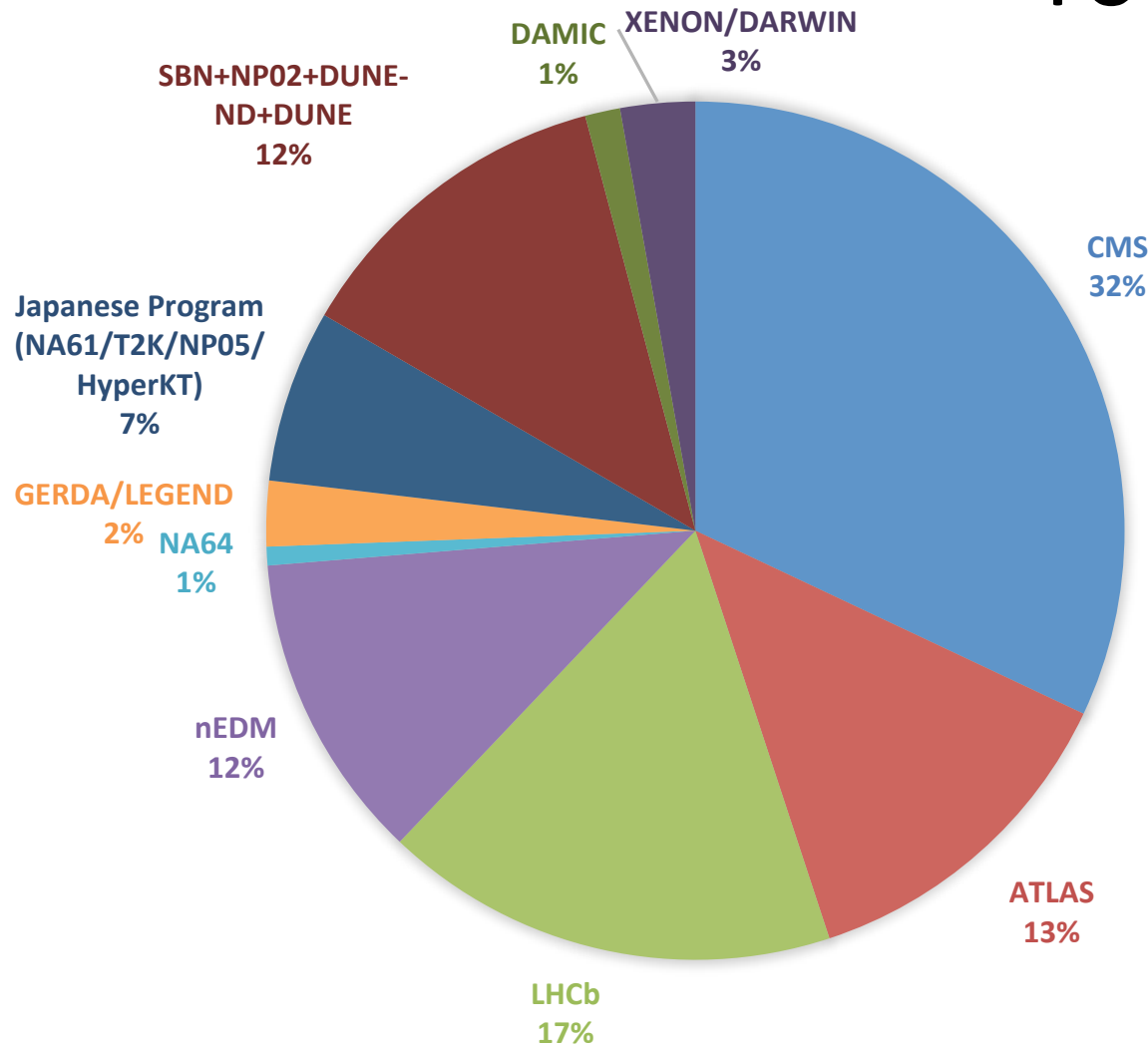
# For the priority consideration (I)

- **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.

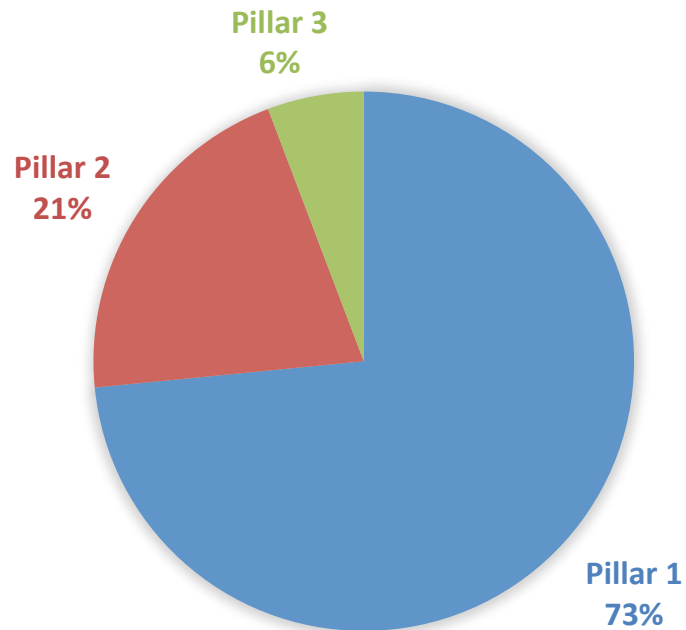
NB: FLARE: 2019-2020

Available: 10.322 MCH

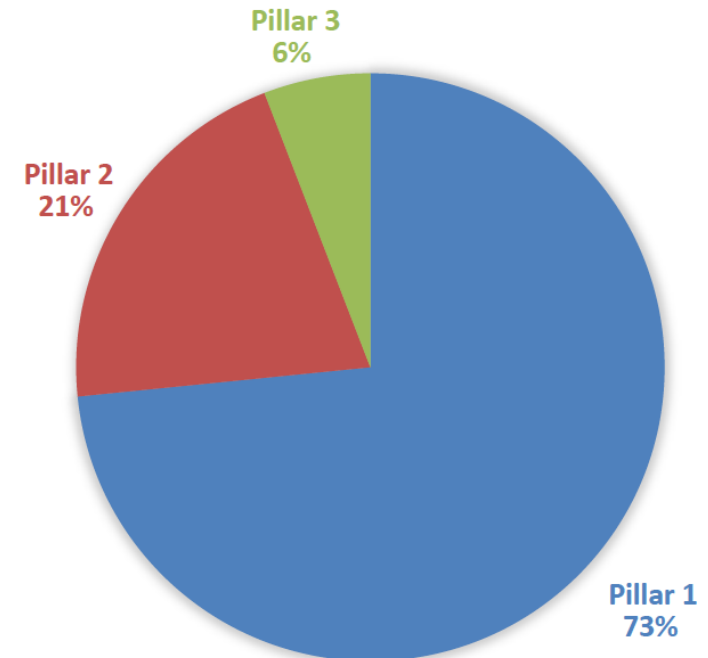
CHIPP programme requested: 9.173 MCH

# 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%