Gather **researchers** in **France** working on **dark energy** in a way or another :

- theory
- Euclid
- LSST
- (+ DESI, DES)

==> scientific animation between all these communities

"thing" without any official status but with a nice logo !
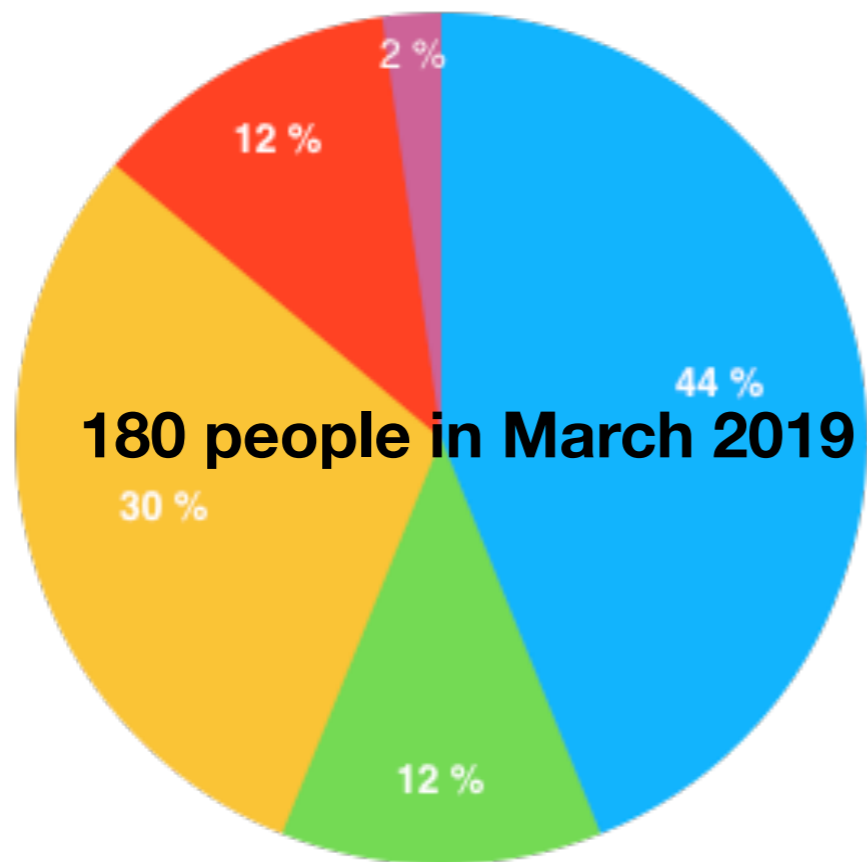(thanks to the LAL's graphist)

Supported by :

General organisation

- Founded by Alain Blanchard (INSU, Euclid), Philippe BRAX (IRFU, théorie) and Emmanuel Gangler (IN2P3, LSST)

- I replaced E.G. when he took the head of LSST-France en April 2018

- Scientific council composed by a representative of each lab: circulation of the information and validation of requested talks at the colloquium

- Demands of grants (PNCG, PNGRAM, IN2P3, CNES, OCEVU). Significant and regular supports

- Want to make a durable structure in a form TBD (mail to Institutes in February 2019). No official feedback.
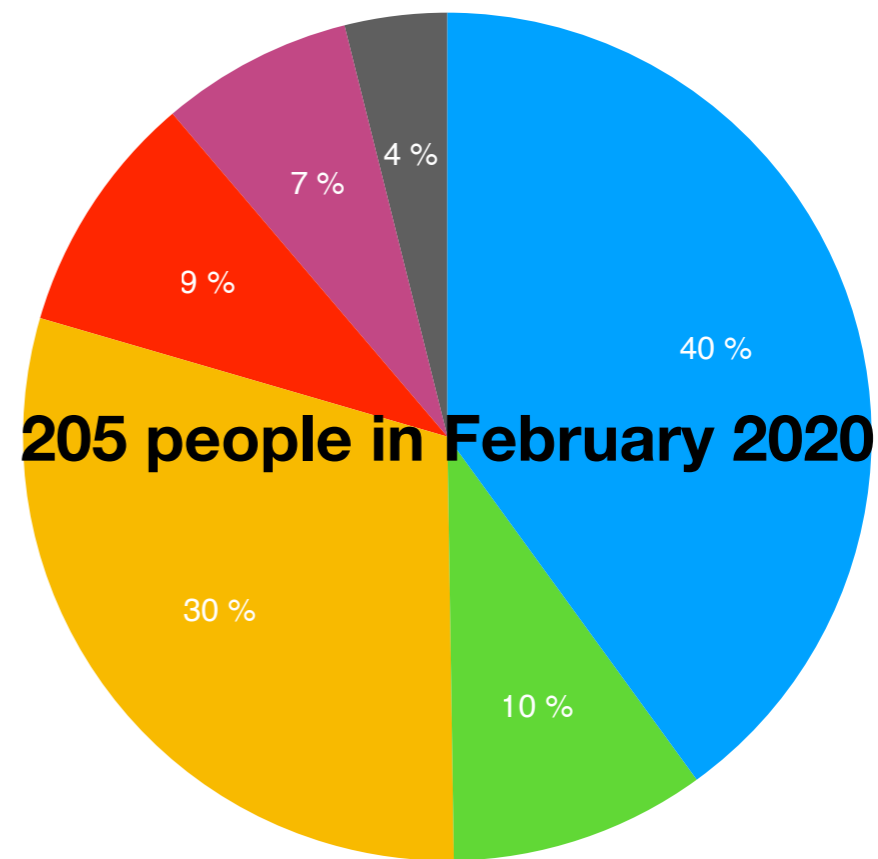
Members

180 people in March 2019

Legend: IN2P3, INP, INSU, IRFU, étranger

- 44 %
- 12 %
- 30 %
- 12 %
- 2 %

- 9 IN2P3 labs
- 7 INSU labs
- > 10 INP labs
- obspm is 1 labo

Here post-docs are recorded according to their PhD lab

205 people in February 2020

Legend: IN2P3, INP, INSU, IRFU, étranger, non id

- 40 %
- 10 %
- 30 %
- 9 %
- 7 %
- 4 %

Here post-docs are recorded accorded to their current lab
non id = unknown or CNES

Welcome to connected subjects (like DM), in particular for young researchers

What do we do ?

- Organisation of an annual colloquium (~100 participants). Took place in labs of IN2P3 (LAL), INSU (IAP), INP (IHP) - IRFU too difficult access. LPNHE in 2020. We want then to "stabilize" the colloquium at IHP around mid-october : 13-14 Oct. 2021

- 3 workshops :

  - Theories (coordinators Ph. Brax + TBD)

  - Probes (coordinators A. Blanchard + TBD)

  - Tools (coordinators Guilhem Lavaux + Stéphane Plaszczynski)

  - separated sessions during spring 2019 ; parallel sessions in October 2019.

  - consecutive sessions in Marseille (19-20 mai 2020)

- Installation of a wiki : https://action-dark-energy.obspm.fr/ (thanks to Yann Rasera)

  - mailing lists (thanks to S.P.,"contacts" page), agenda

  - collaborative tool: references, contacts etc to be filled by people

Workshops subjects (wiki)

Theories

Quantum vacuum

Dynamical dark energy

Modified gravity

Inhomogeneous cosmology

Dark matter, neutrinos and dark energy

Non-linear regime

Relativistic effects

Other messengers (neutrinos, gravitational waves)

Probes

Clustering 2D

Clustering 3D (correlation function, voids, RSD, BAO)

Cross-correlation

Weak Lensing

Strong Lensing

Supernovae

Clusters

Gravitational waves

Other probes (velocity fields,etc)

Tools

Homogeneous expansion (FLRW and beyond)

Linear perturbations (Einstein-Boltzmann solvers)

Simulations (cosmological simulations)

Non-linear evolution (approximate methods such as perturbation theory, halo model)

Methods for analysis (methods for data processing such as objects finder, correlator, MCMC, machine learning)

Visualization

Validation data

Computing Centers

See you the 19-20 of May in Marseille

Example of discussion: the H0 problem

- 1-hour review during the theories workshop (Silvia Galli)
- CMB in (relative) tension (Matthieu Tristram)
- The Leavitt law of Milky May Cepheids from Gaia DR2 static companion parallaxes (Louise Breuval)
- Résultats de DES (Emmanuel Bertin)
- The trouble with Hubble: signs of new physics ? (Vivian Poulin)

- **Be careful with "hidden" systematics**
- **Few "recent" observables agree with CMB but some agree with SN Ia**
- **Some extension of the LCDM can solve the discrepancy but no really easy way**

—> need for detailed studies for systematics
—> need for more data from various probes
—> need for more theoretical investigations

ESA Prospectives: Voyage 2050

"The Agency is soliciting ideas from the scientific community for the science themes that should be covered during the Voyage 2050 planning cycle.

White Papers are not proposals for specific missions; they should rather argue why a specific scientific theme should have priority in the Voyage 2050 planning cycle. At the same time, and to ensure realism in the resulting Programme, applicants should briefly illustrate possible mission profiles."

—> Brainstorming session in May 2019
—> redaction of a White paper (GAUSS concept == super-Euclid)

Even in case of non-selection as future Large mission (highly probable), will to continue the thought
- try to find smart idea(s) for a medium-size mission
- collaboration with CMB in case "CORE+PIXIE-like mission" selection