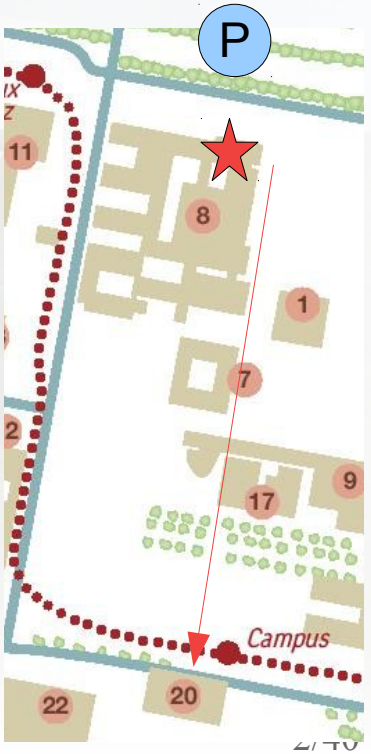
News from

Emmanuel Gangler – LPC – Clermont-Ferrand (France)

Logistics

- 2 rooms 9110 & 9111
  - Tuesday : parallel discussions
    - Morning : Calibration – Machine Learning - …
    - Afternoon : Supernovae – Common tools for other probes
- Lunch: on your own
- Dinner: make sure you have a driver
  - See Philippe Rosnet

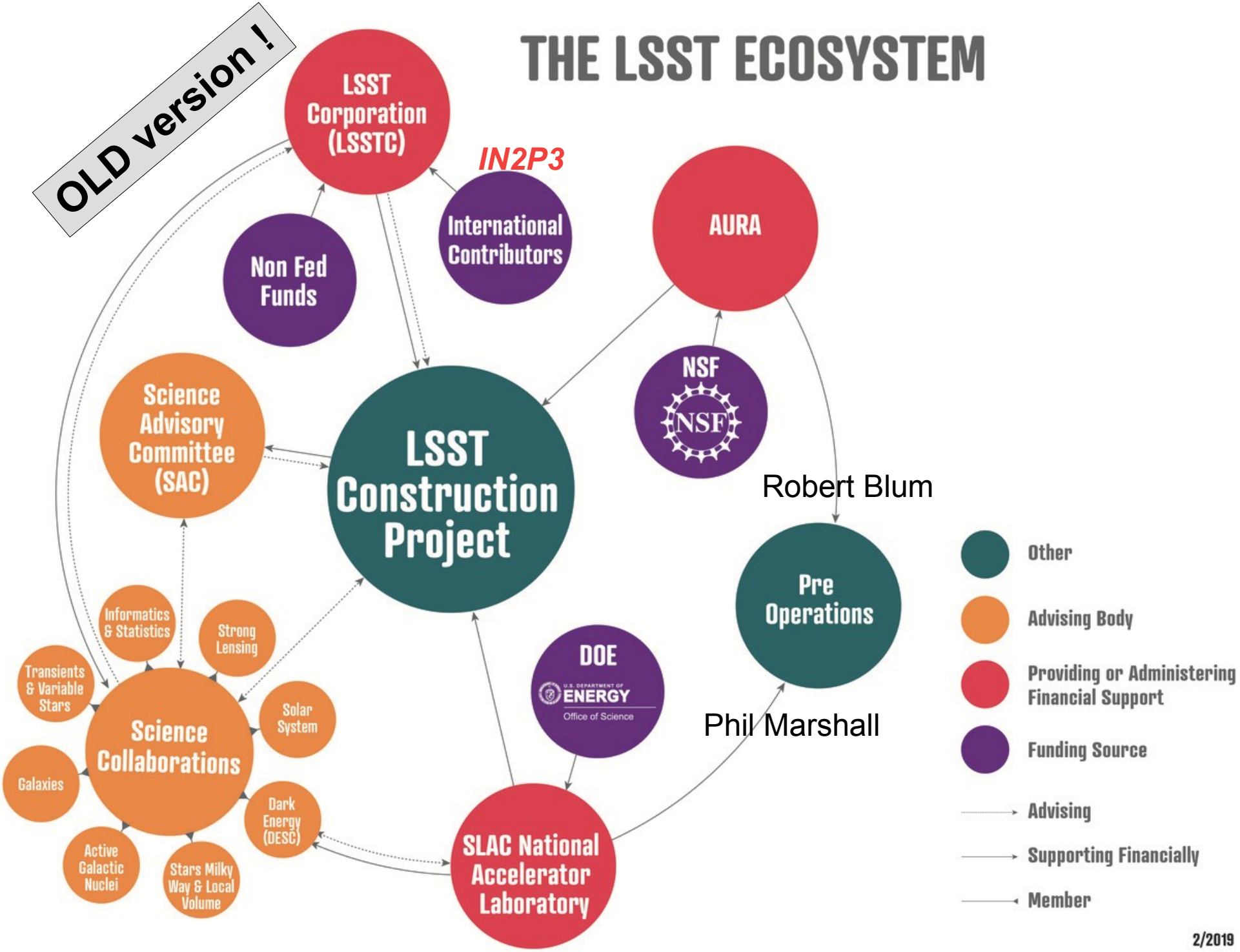
P



New in LSST-France

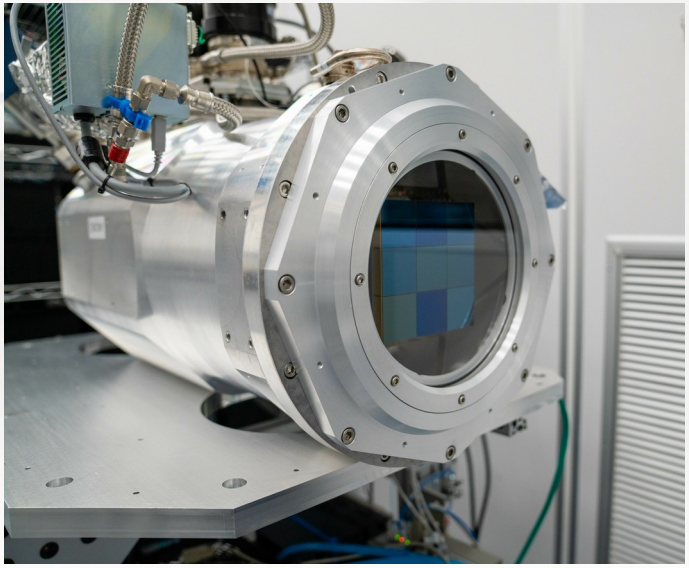
- New members introduction
  - Melissa, Bastien, Tristan, Martin, Bastien, Younglo, Anais, Nicoleta, Sreevarsha
  - Make sure you read the starting pages: https://doc.lsst.eu

- Be nice to our junior & international members !
  - Use english whenever comfortable
  - Let them ask the first questions...


OLD version !
THE LSST ECOSYSTEM
LSST Corporation (LSSTC)
IN2P3
International Contributors
Non Fed Funds
AURA
NSF
NSF
Science Advisory Committee (SAC)
LSST Construction Project
Robert Blum
Pre Operations
Phil Marshall
DOE
U.S. DEPARTMENT OF ENERGY
Office of Science
Informatics & Statistics
Strong Lensing
Transients & Variable Stars
Science Collaborations
Solar System
Galaxies
Dark Energy (DESC)
Active Galactic Nuclei
Stars Milky Way & Local Volume
SLAC National Accelerator Laboratory
Other
Advising Body
Providing or Administering Financial Support
Funding Source
Advising
Supporting Financially
Member
2/2019

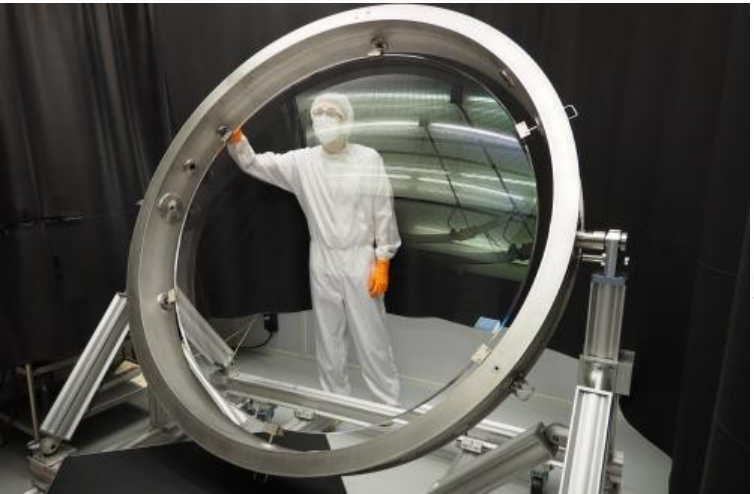
LSST Project news

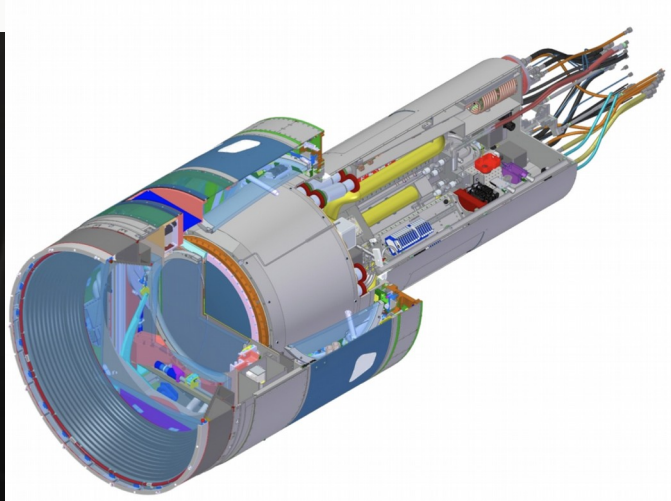
- Make sure to check https://www.lsst.org/news/digest (if not in project mailing list)
- Publication: "LSST: From science driver to reference design and anticipated data products "
- CC preparting for data deluge
- Rafts inserted into ComCam



LSST Project news

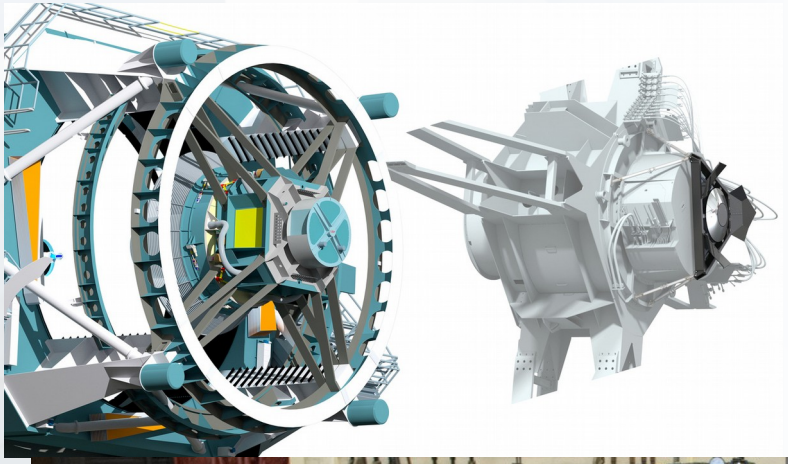
- M1M3
  - Interferometric characterization in Tucson
  - Shipped to the summit
  - Arrived May 11th
- L1 coated
  - Anti-reflective coating



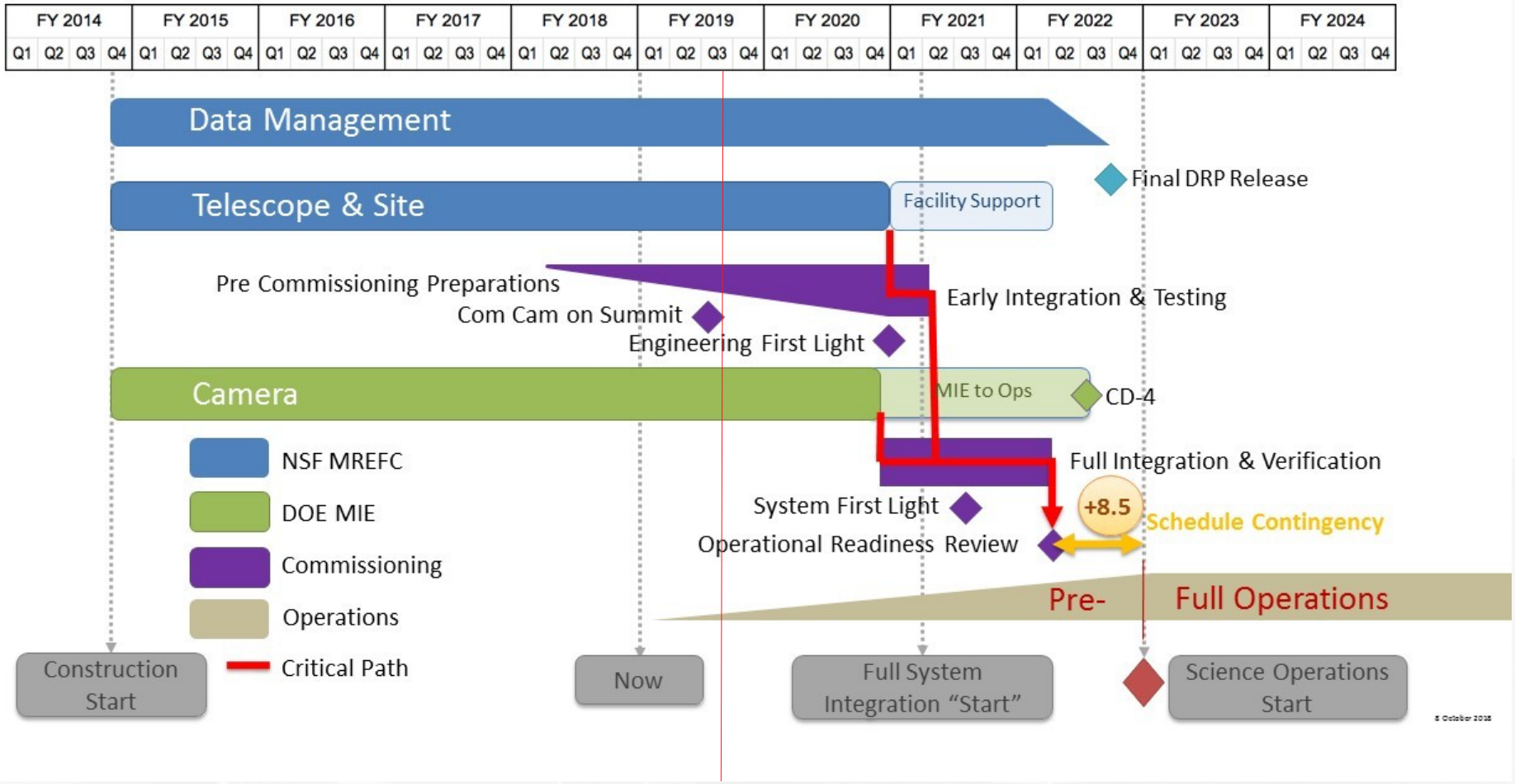


LSST Project news

- Calibration
  - Calibration screen reflector
    - (Flat Field)
  - Differential Image Motion Monitor (DIMM)
    - Atmosphere turbulences



LSST Project Schedule – 8.5 Months Contingency



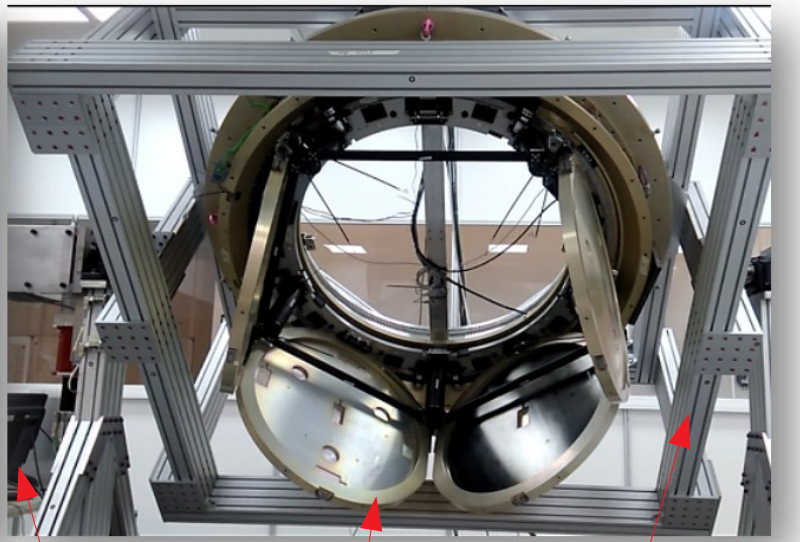
Filter Exchange Systems Complete and Tested

Successful collaboration
Within 5 IN2P3 labs !

- Collaboration with IN2P3 labs in France for key Camera elements
- Filter Autochanger and Manual loader (6th filter) full size prototype completed and tested
- Carousel full size prototype completed and tested – Only final assembly on camera back flange remains

Filter Autochanger

Filter loader on transport cart



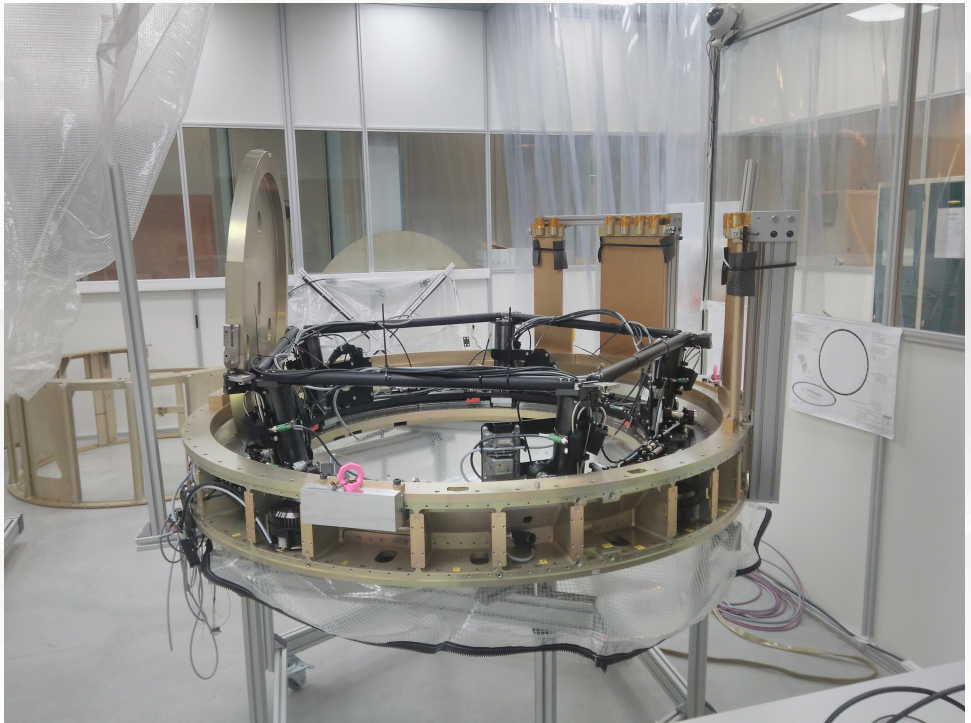
5 Filter capacity carousel

CPPM LPSC APC LPNHE LPC

→ *A successful story…. So far … but …*

Filter exchange system

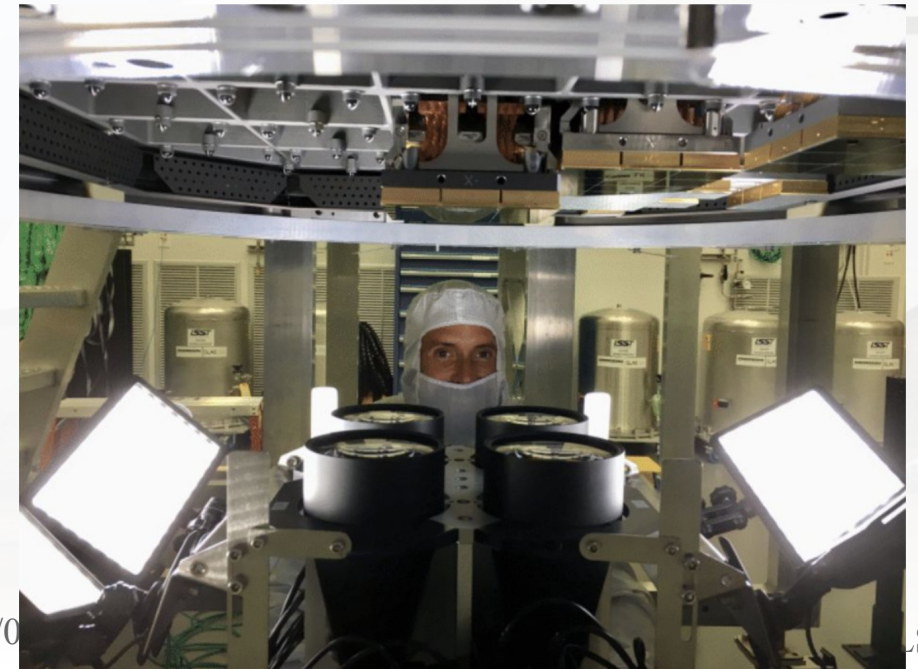
- Heavy pressure on French teams !
  - On the critical path (but other parts too) !
    - Whole team shocked by April 10th accident
    - Corrective action taken
    - Only 1 month remaining for assembling the carrousel
    - Safety first !

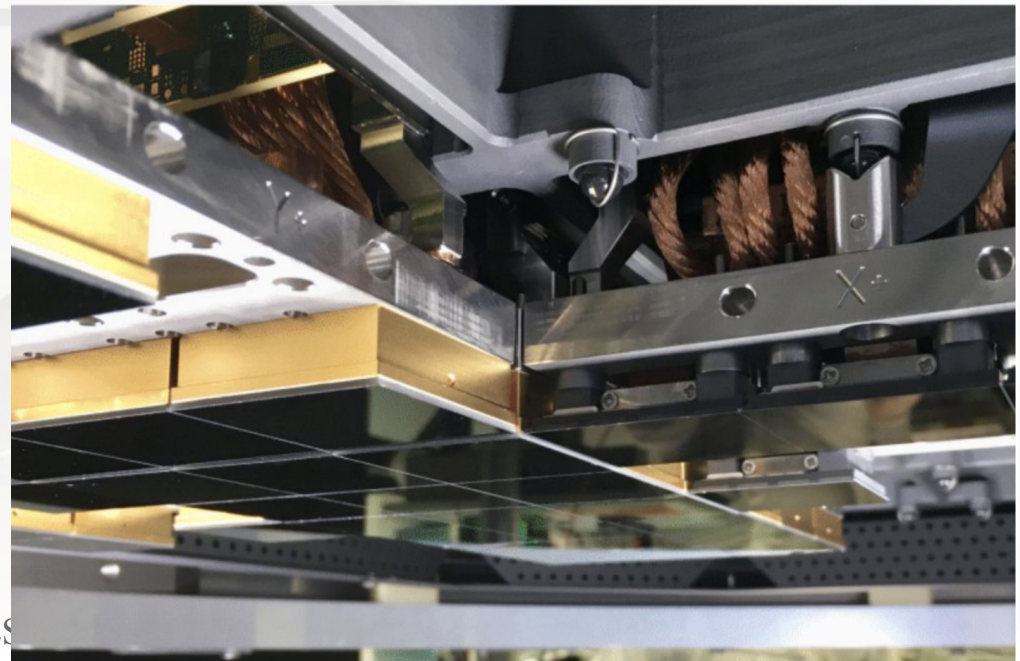


Other potential sources of delays

- Telescope mount (vendor delays…)

- Focal Plane reassembly
  - ITL probably OK, potential failure modes for E2V…

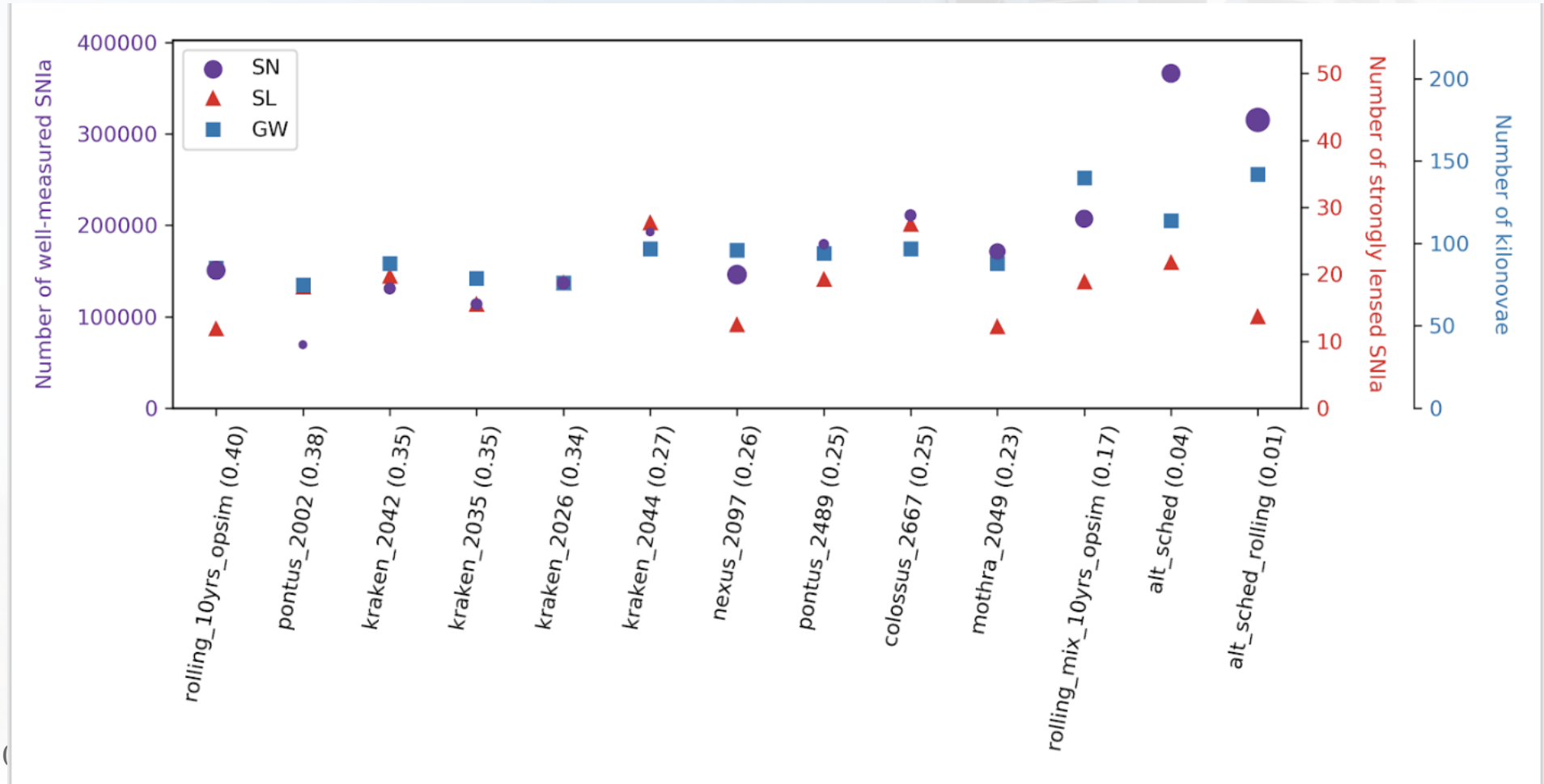




Cadence

- Call for white papers due Nov. 2018
- 46 submissions
  - 2 submission by DESC : WDF & DDF

    → New cadences being simulated for full metrics

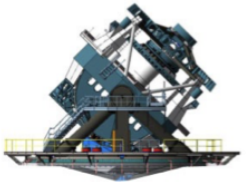


SAC recommendations

- WFD:
  - Footprint & exp. times:
    - cut in galactic extinction; wider declination range; dithering
    - *Move to 30s rather than 2x15s* (acknowledges the different exposure lengths per snap).
    - 1s (twilight) and 5s full-sky for bright objects ; variation of u-band exposures (read-noise limited)
  - Filters :
    - *Filter change for exposure repeats*: many options (force change, impose pattern r→r, g→ i, r→z, …)
    - u within ±2 days of new moon, y otherwise
    - High galactic latitude : prioritize bluer filter cadence
  - Cadence
    - *Rolling cadence* ½, 1/3 or up to 1/6 of footprint + modest coverage of other half. 1st and last years full coverage
    - Open to anti-24H aliasing studies
    - Check that Opsim optimizes season length

SAC recommendations

- DDF:
  - Dithering
  - *SN and AGN come up with different plans* ; same location
    - 2,4,8,25,4 grizy for SN ; gri, zy alterning every 3 days
    - (4), 1,1,3,5,4 grizy for AGN ; (u)grizy every 2 days
    - Try hybridized approach
  - Additional fields: **Euclid 20°**, first years; (WFIRST ?)
    - +5 Ecliptic fields
- Mini-surveys:
  - Push north, up to +30 (maximizes **overlap with DESI, Euclid**), or Ecliptic + 10°
  - Push south: all south <60° ; Magellanic clouds
  - Low Galactic latitudes (+Bulge)
  - Twilight (NEA, Differential chromatic refraction)
- Others
  - TOO: **GW 2% of obs time** (to be reassessed)
  - Movie-mode: during commissionning, not OpSim



LSST Data Product Access

World Public

World Public data can be shared with everyone; data rights not required

Alerts: Alerts are immediately world public and can be shared with everyone

Data Releases: Data Releases are world public **two years** after release.

Education & Public Outreach (EPO): All data products accessed via the EPO platform

Proprietary

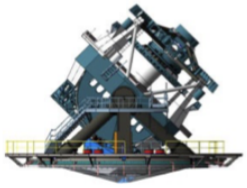
Proprietary Data can only be shared with data rights holders

Alerts Database: Archive of all issued alerts

Prompt Products Database (PPDB): Difference Images, Source Catalogs including pre-covery forced photometry

Data Releases: Two year proprietary period for annual 'DRP' Data Releases (images, catalogs)

Science Platform: Computational resources, mini-broker and data portal are accessible only by data rights holders



Alert Packets

Alert Packets: *text file containing the data for one DIA source and associated schema*

- *alertID*: An ID uniquely identifying this alert. It can also be used to execute a query against the Level 1 database as it existed when this alert was issued.
- *Level 1 database ID*
- Science Data:
  - The `DIASource` record that triggered the alert
  - The entire `DIAObject` (or `SSObject`) record
  - Previous 12 months of `DIASource` records
  - Matching `Object` IDs from the latest Data Release, if they exist, and 12 months of their `DIASource` records
- Cut-out of the difference image centered on the `DIASource` (10 bytes/pixel, FITS MEF)
- Cut-out of the template image centered on the `DIASource` (10 bytes/pixel, FITS MEF)

LSE-163: Data Products Definition Document

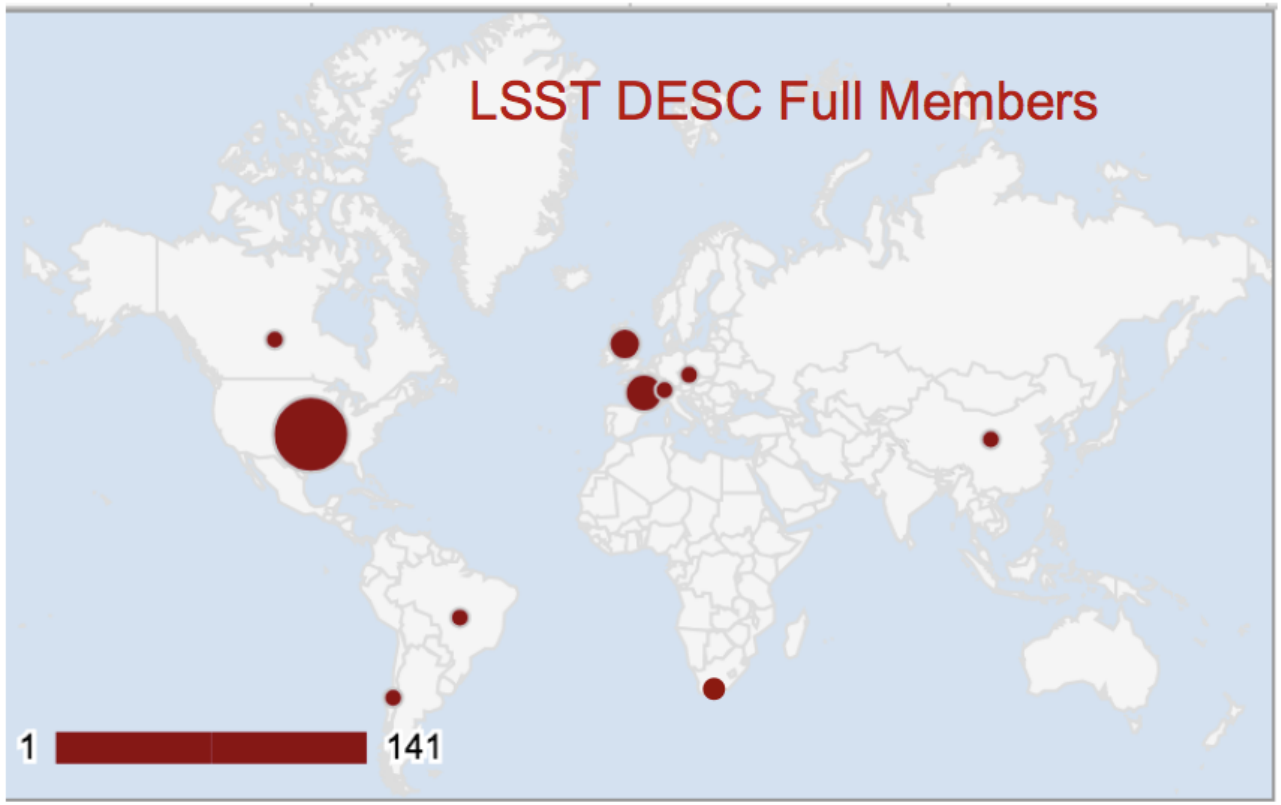
Call for Brokers

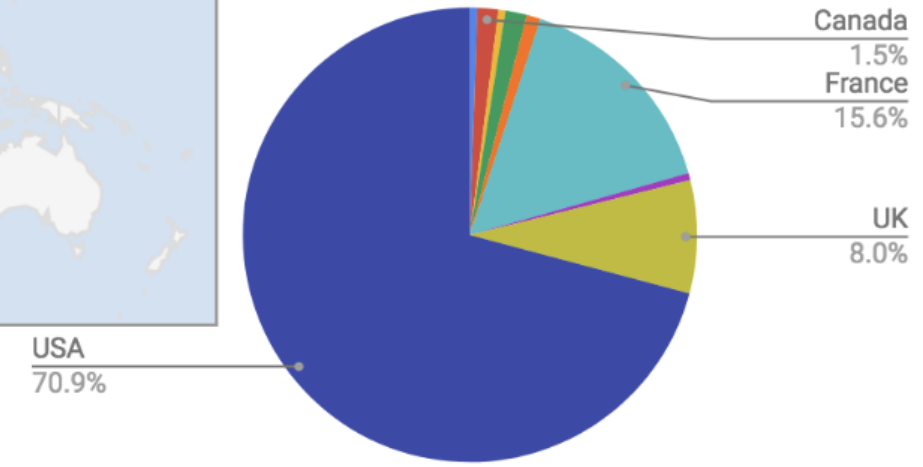
- Requirements:
  - Ability to ingest, process & distribute LSST alert stream
  - Institutional and personnel support
- Timeline:
  - Submission of LOIMay 15th,
  - Full proposal Q4 2019,
  - Selection Q2 2020
- DESC : Letter of Non Intent !

  → FINK


PENDANT CE TEMPS A VERA CRUZ

We are a large community of scientists getting ready to do cosmology with LSST

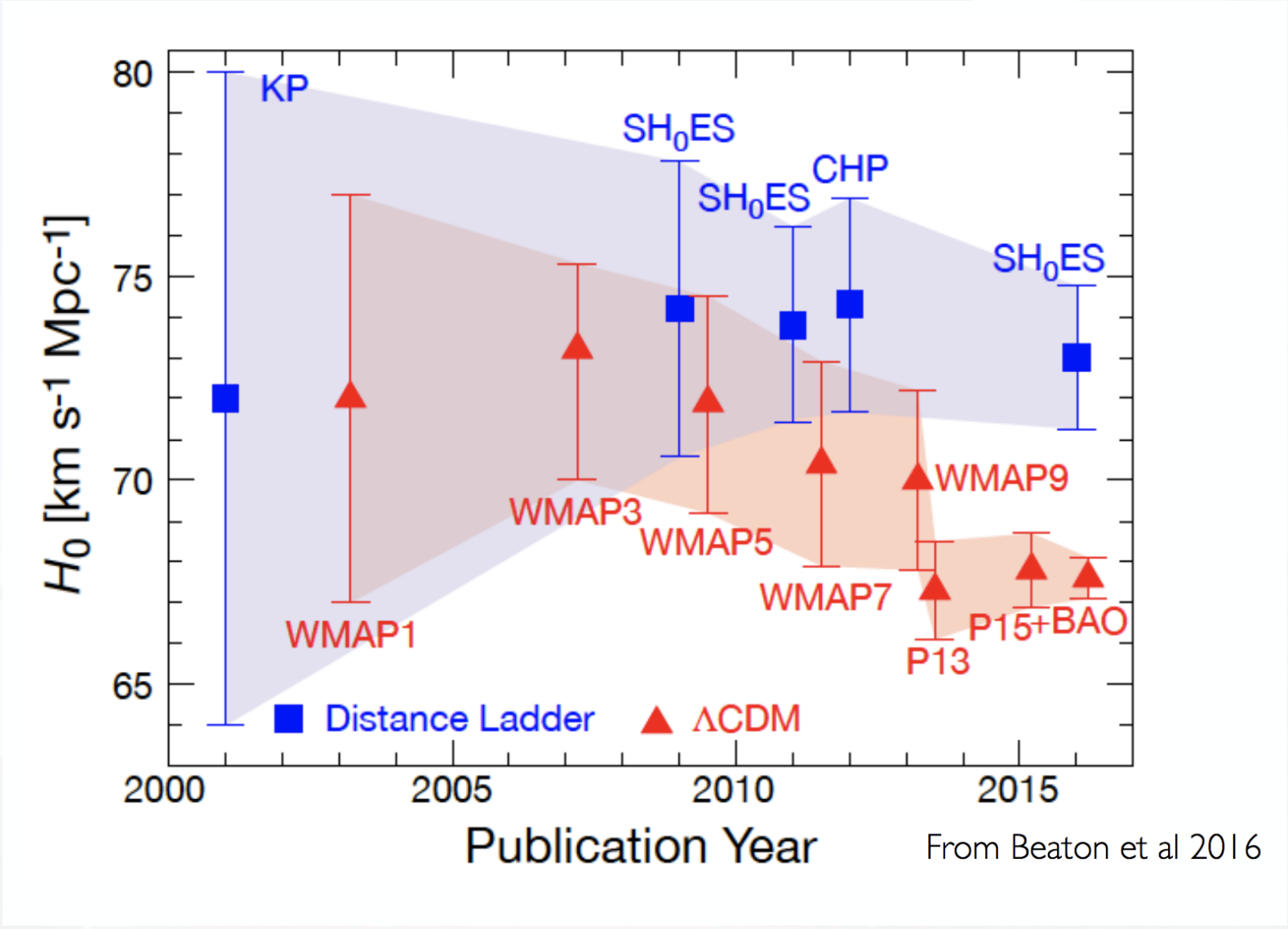




DESC has 929 Members, of which 214 are “Full Members”

DESC News

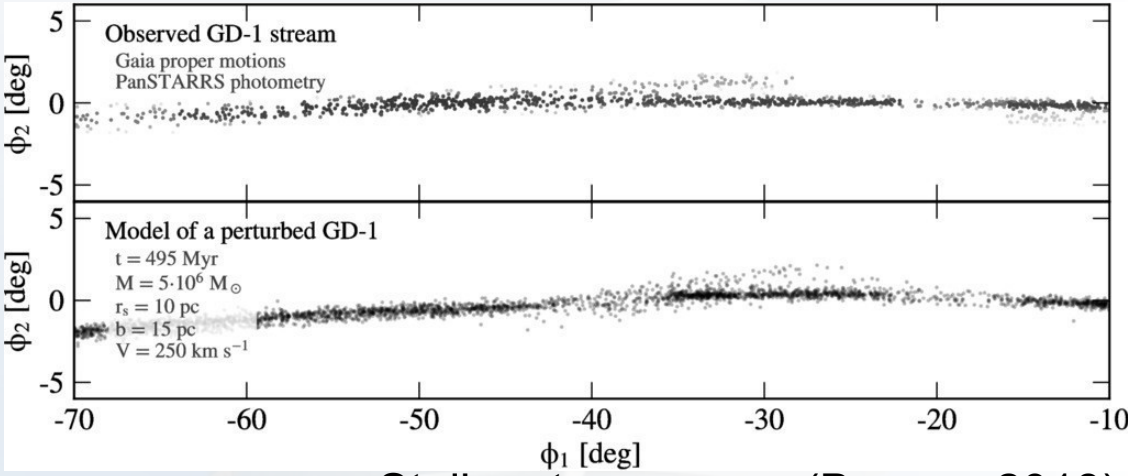
- Make sure you:
  - Read the Newsletter (mail to DESC members)
  - Attend DESC seminars
- New management
  - Rachel Mandelbaum will take over July 1st
    - Deputy Spokesperson: Pat Burchat (Stanford)
    - Analysis Coordinator: Anže Slosar (Brookhaven) +2 deputy TBD
    - Computing and Simulations Coordinator (CSC): Katrin Heitmann (Argonne)
      - Deputy CSC: Jim Chiang (SLAC)
    - Data Coordinator: Michael Wood-Vasey (University of Pittsburgh)
    - Technical Coordinator: Pierre Antilogus (IN2P3 LPNHE)
  - Council updates
    - Membership review (Eric, Cécile), software review (Céline), speakers bureau (Cécile) policy committees
    - Advisory board ?
  - Remark: **not enough feedback to LSST-France !!!**



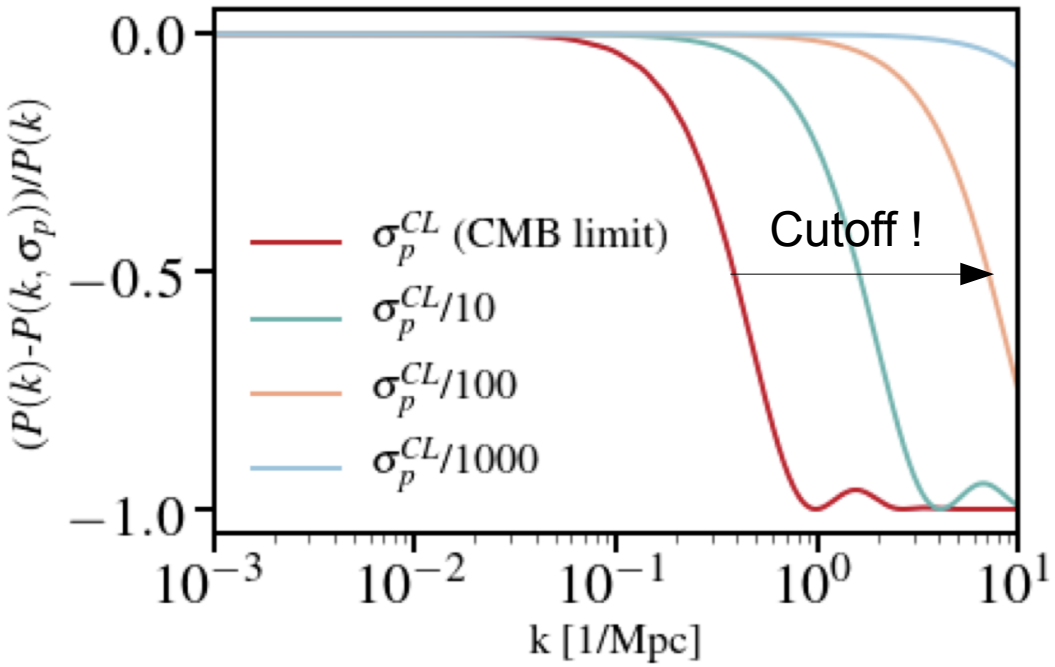
DESC seminar May 22th
(See also PSF seminar Jan 23th)

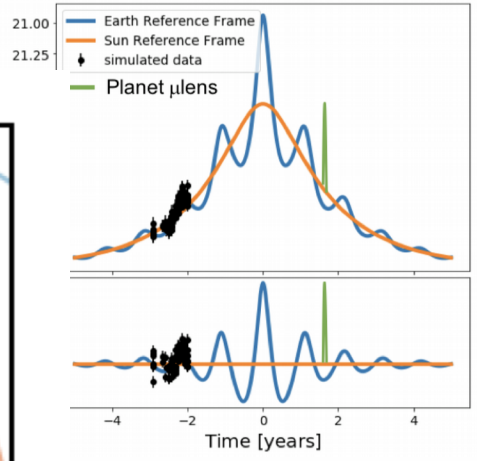
DESC and dark matter

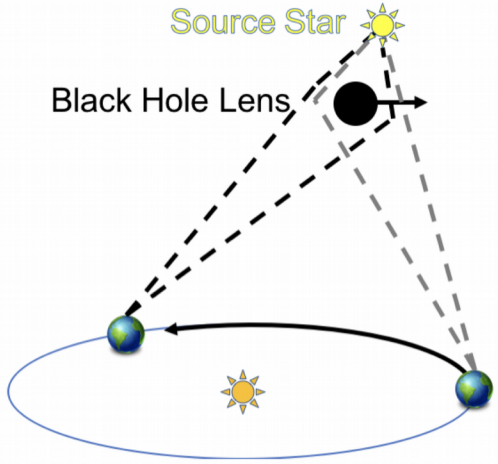
- ArXiv:1902.01055
  - Minimum halo masses
  - Halo profiles
  - Microlensing
  - Anomalous energy loss
  - Large scale structure



Stellar stream gaps (Bonaca 2018)

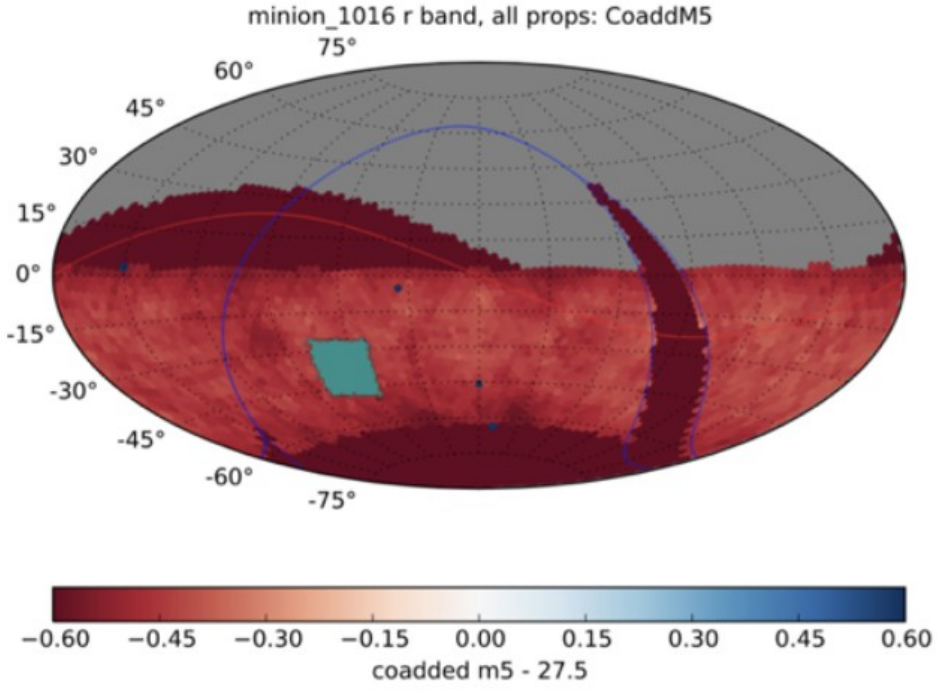




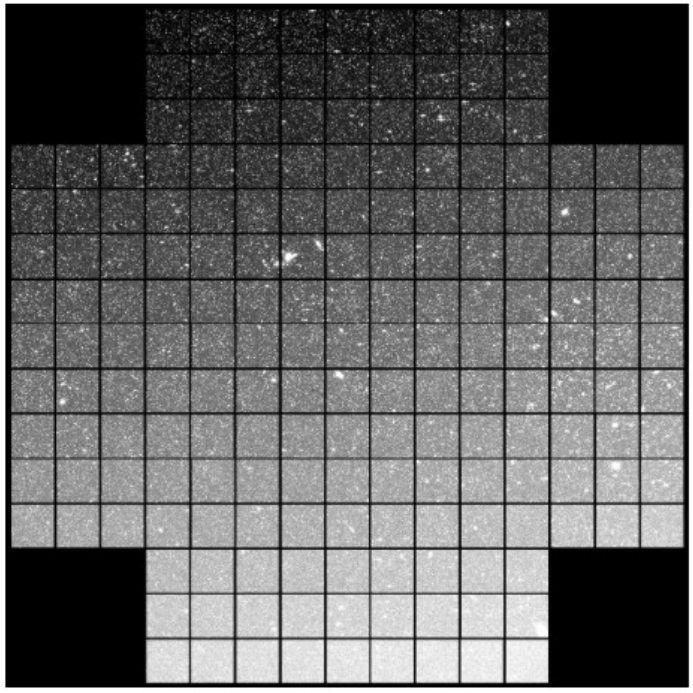


Matter power spectrum is sentitive to Dark Matter microphysics !

DC2: A virtual LSST sky survey



Virtual Sky Survey Area

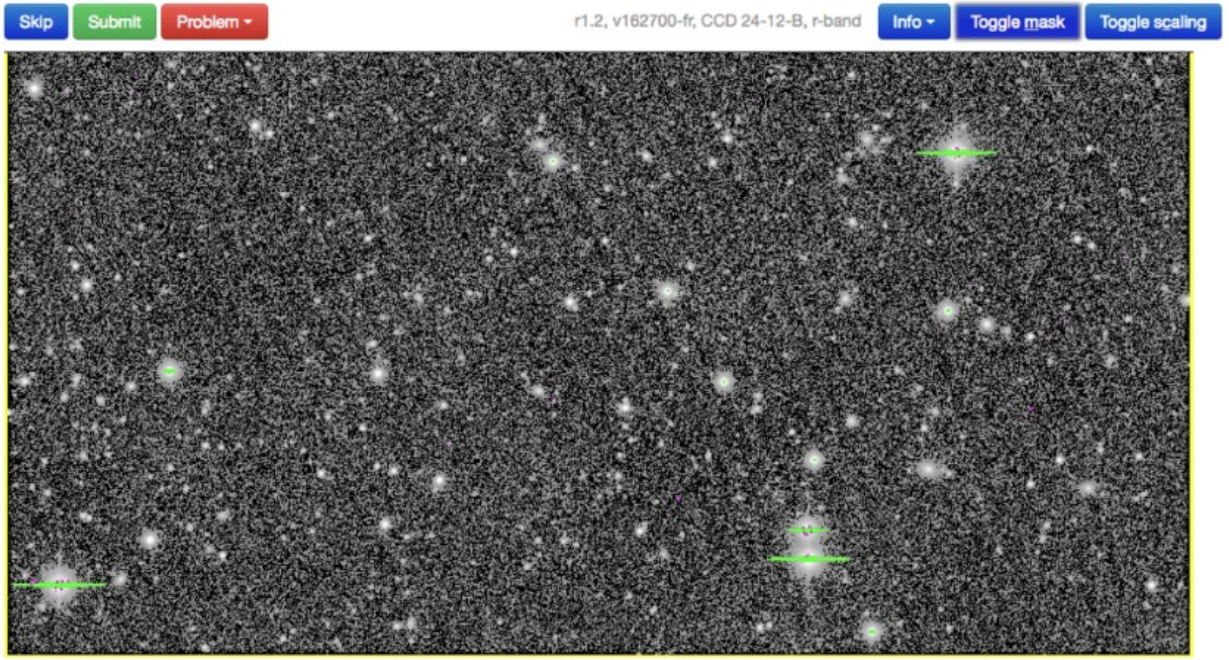


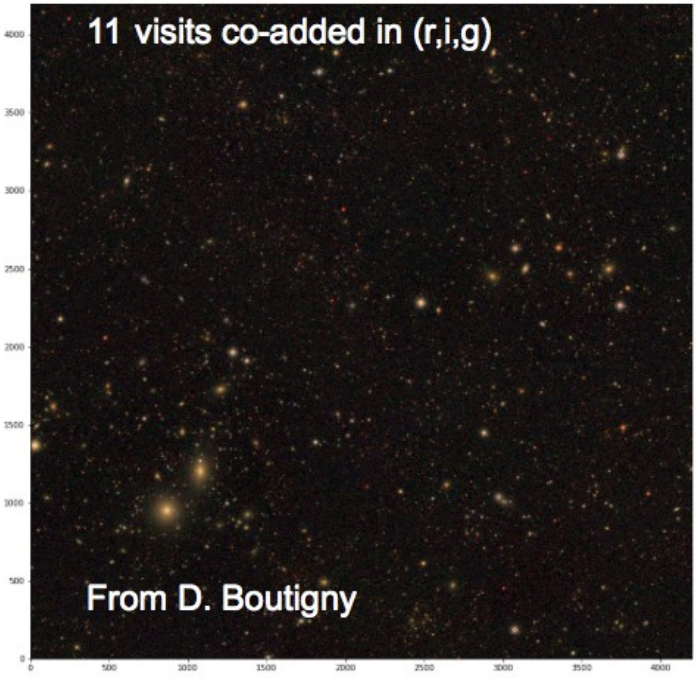
Simulated LSST focal plane

- **Static sky** (WL, CL, LSS, PZ) with images: **300 sq deg** "main survey" area, 3+ years *ugrizy* Wide-Fast-Deep (WFD) cadence - *cf. the LSSTCam 10-yr depth SV survey*
- **Time domain** (SN, SL) analyses: **1 sq deg** "ultra Deep Drilling Field (DDF)" in corner of main survey, 10 years *ugrizy* WFD + DDF visits

DC2: Simulated LSST Images

Realistic LSST images based on cosmological simulations. **Aiming for 2020 public release**.





Makes use of:

- **CosmoDC2** - Extragalactic catalogue based on N-body sims & semi-analytic models
- **ImSim** - LSST DESC Image Simulator
- **PhoSim** - LSST Photon to Pixel Simulator
- The **LSST DM Pipeline**

DESC Follow-up Task Force

See the Astro2020 decadal survey white papers for DESC's highest priority science cases:

1. *"**Wide-field Multi-object spectroscopy** in support of dark energy science with LSST"*
2. *"**Deep Multi-object spectroscopy** in support of dark energy science with LSST"*
3. *"**Single-object imaging and spectroscopy** in support of dark energy science with LSST"*

- Need multi-object spectroscopy (**4-15m**) across as much of footprint as possible
- Deep (i ~ 25, **8-40m**) MOS on the DDFs
- Single-object spec & imaging (**4-40m**) for some SN and strongly lensed objects

→ Do we agree within LSST-France SN group with this vision ?

Plasticc Results

Featured Prediction Competition

PLAsTiCC Astronomical Classification

Can you help make sense of the Universe?

LSST Project · 1,094 teams · a month ago

1,094	1,384	22,895
Teams	Competitors	Entries

$25,000
Prize Money

Overview | Data | Kernels | Discussion | Leaderboard | Rules

Launched Sep 28th 2019
Due dec 14th 2019
147 public kernels
279 discussion topics

Overview

- Description
- Evaluation
- Prizes
- Timeline
- PLAsTiCC's Team

Help some of the world's leading astronomers grasp the deepest properties of the universe.

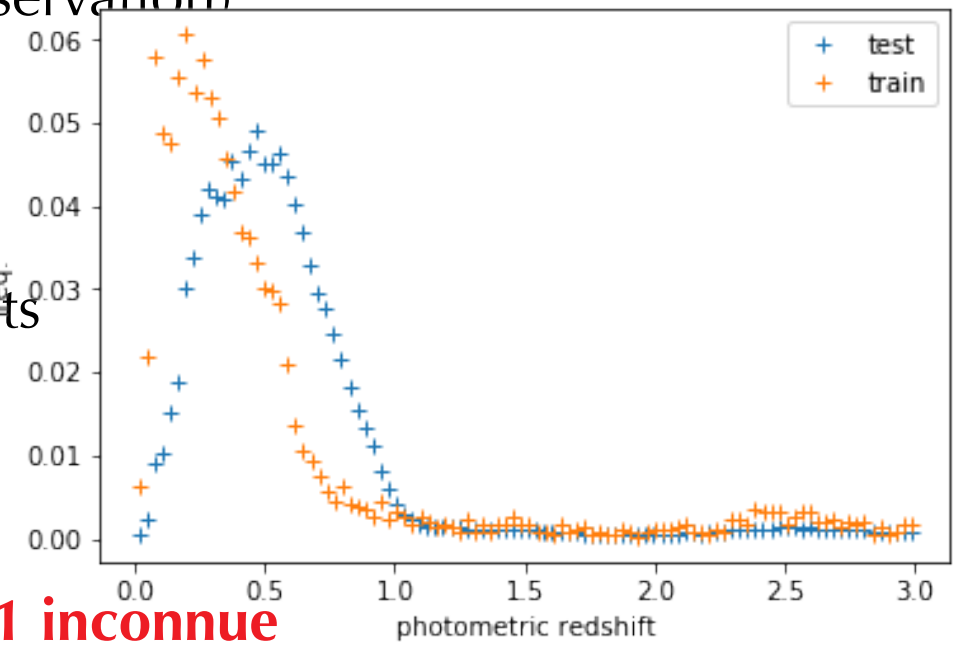
The human eye has been the arbiter for the classification of astronomical sources in the night sky for hundreds of years. But a new facility -- the Large Synoptic Survey Telescope (LSST) -- is about to revolutionize the field, discovering 10 to 100 times more astronomical sources that vary in the night sky than we've ever known. Some of these sources will be completely unprecedented!

The Photometric LSST Astronomical Time-Series Classification Challenge (PLAsTiCC) asks Kagglers to help prepare to classify the data from this new survey. Competitors will classify astronomical sources that

Données de PLAsTiCC

- Données ***réalistes*** simulées
  - 3 ans de fonctionnement de LSST, 1/150ème de l'empreinte
    - **Volume** : ~450 000 000 mesures

      (équivalent à ~7 jours de transitoires hors astéroïdes)
    - Trous dans les séries (saisons d'observation)
  - Problèmes de **représentativité**
    - Lot d'entraînement : 7 848 objets
    - Lot d'application : 3 492 890 objets
    - Entraînement mieux mesuré
  - 15 classes d'objets
    - 5 galactiques, 9 extragalactiques, **1 inconnue**



Plasticc : retour sur expérience

- **Soumission gagnante :**
  - *Adaptation de domaine et augmentation de données*
  - Processus gaussiens (**temps de calcul !**)
  - Extraction de motifs
  - Classificateur *Light Gradient Boost Model*

Step	Approximate time to run
Augmenting the training set	1 hour
Fitting the GP and calculating features	**10 objects/s -> 100 hours for test set**
Training the model	20 minutes
Generating predictions	40 minutes

- #2-9 : peu de diversité…
  - *Ensemble de classificateurs*, 2 *RNN*
  - #5 : Ajustement par templates (sous-optimaux) pour déterminer les motifs
- #10 : PELICAN (Johanna Itam-Pasquet, CPPM)
  - Autoencodeurs sous-performants → piste de collaboration
- **Remarques :**
  - Kernels disponibles, beaucoup d'information à exploiter
  - « triche » concernant la classe 99
  - Résultats tributaires du modèle de photo-redshift

And now …
So what ?

New Data Rights Framework

1. LSST will maintain the proprietary period for LSST data release and the open LSST alert stream with no proprietary period as previously planned---*i.e.*, no change.

All data-related documents LDM xxx remain valid a priori !

1. LSST will maintain the proprietary period for LSST data release and the open LSST alert stream with no proprietary period as previously planned---*i.e.,* no change.
2. The agencies have no plans to de-scope LSST operations and are working with their awardees (AURA and SLAC) on updated budget and operations planning.

Around 15 M$ to be found by the agencies
LSSTC failed to raise such an amount...
Fear of indirect descope, for instance : DESC operations

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3. Following agencies' approval, the LSST project team will soon publish data rights and data access policies for LSST.

Soon is not yet defined…
Depends on the global timeline

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3. Following agencies' approval, the LSST project team will soon publish data rights and data access policies for LSST.
4. International participants may enjoy the same data access rights as US scientists in exchange for in-kind contributions to the LSST construction project, facility operations, and/or related astrophysical resources as considered and agreed to jointly by the agencies (NSF and DOE).

Replaces cash → in kind

LSSTC will "no longer" collect cash from International Contributors

… but is already doing that (for instance IN2P3 pays CCDs)

A lot of countries have submitted proposals for cash

they have to revisit their plans, make sure they can keep the money

We are already in kind !

What is acceptable in kind ?

What model to count how many PI is an in kind worth ?

Same Data Access rights: no more difference access ↔ rights ?

IN2P3 situation may be different here

1. LSST will maintain the proprietary period for LSST data release and the open LSST alert stream with no proprietary period as previously planned---*i.e.,* no change.
2. The agencies have no plans to de-scope LSST operations and are working with their awardees (AURA and SLAC) on updated budget and operations planning.
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4. International participants may enjoy the same data access rights as US scientists in exchange for in-kind contributions to the LSST construction project, facility operations, and/or related astrophysical resources as considered and agreed to jointly by the agencies (NSF and DOE).
5. A new LSST Resource Board, led by NSF and DOE, will oversee and coordinate in-kind contributions and provide a forum for project contributors to participate in the LSST resource planning. The details of that Resource Board will be developed over the next year.

Robert Blum forsees an announcement around August (Tucson)

Partnership model “a la” HEP ?

- NSF's and DOE's intent is for international participants to retain their status within the project through new agreements between their agencies (or institutions, if applicable) and NSF and DOE. The status of these international participants will remain unchanged until this process is completed by June 30, 2021.

LSSTC will maintain PI and Junior list until new MoAs are signed

- Existing MOAs that provide data rights to proprietary LSST data in exchange for *in-kind* (*i.e.,* non-monetary) considerations will be reassigned to NSF, DOE, or an NSF-designated agent and will be implemented. Beyond this, no other significant changes are expected from the original plans regarding in-kind contributions or LSST data rights.

No major change for IN2P3 !
("Tout ça pour ça ?")
But…

- International participants will have a new point of contact (POC), either NSF, DOE, AURA, or SLAC, to be determined as appropriate.

Natural POC for IN2P3 would be DOE …
POC required to make any further progress (August ?)

- Examples of desirable in-kind contributions to LSST might include dedicated software development staff or computing resources that offset LSST operational costs, or access to complementary data sets or follow-up facilities.

What is in kind ?

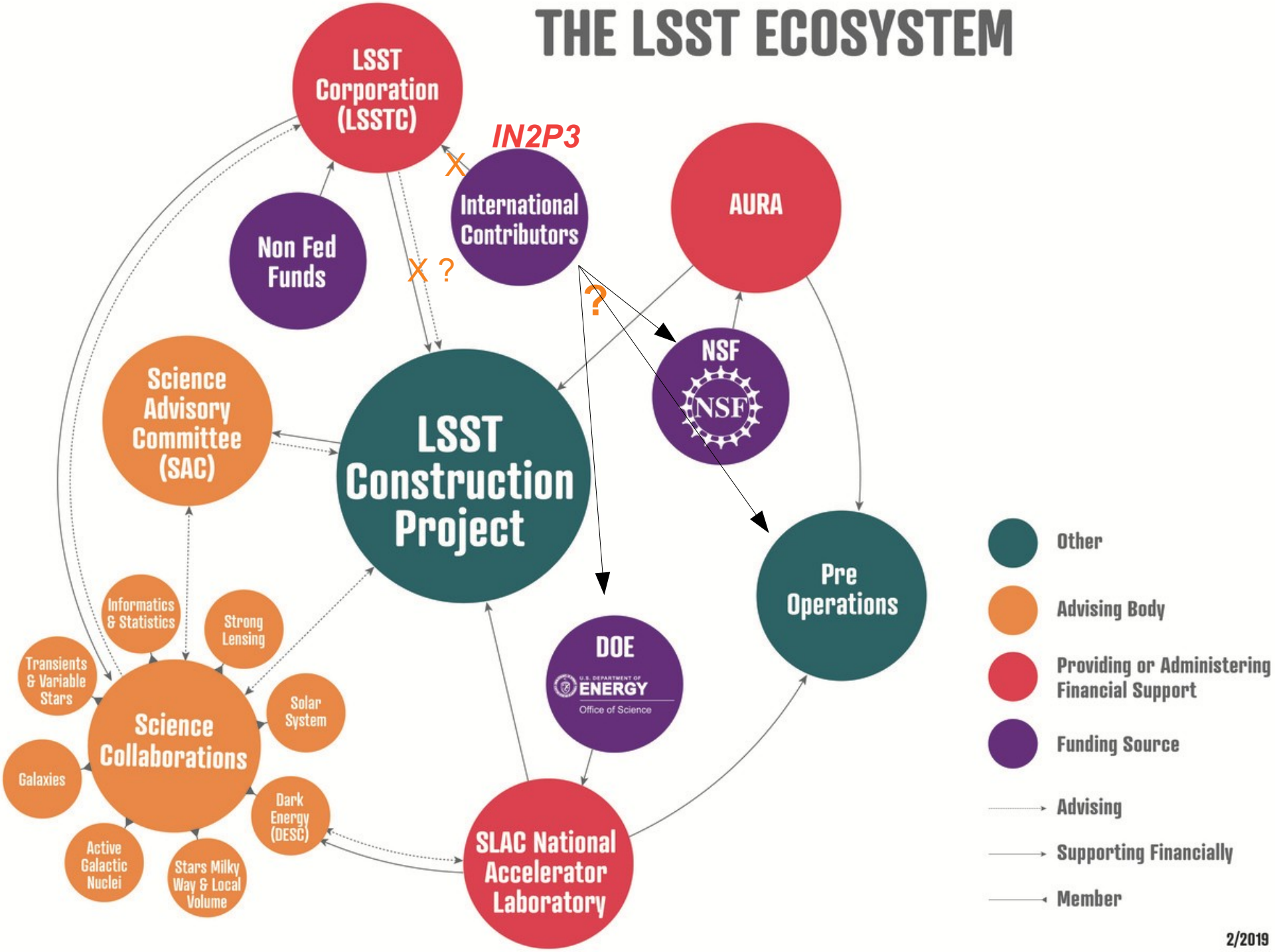
- Already contributed in kind to LSST construction

- Priority to in kind offsetting costs of LSST operations
  - CC sDRP
  - funding post-docs to work under operations

- Less clear regarding complementary data sets
  - Telescope Time on other facilities
  - but probably not broker
  - is a data set made available ot a Science Collaboration count ?
  - what about Euclid ?

- Would DESC in kind count ?
  - DESC would like to go in this direction
  - This is an offset to DOE, not necessarily to NSF
  - Makes in-kind linked to specific science collaboration: is that desirable ?

- What will DESC do ?
  - Direct contact with Steve, Bob, Kathy (DOE), Ed (NSF)
  - may assess scientific interest of in kind proposal (OC would play a role)
  - Help potential IC to come up with interesting in kind (observer status ?)


THE LSST ECOSYSTEM
LSST Corporation (LSSTC)
IN2P3
International Contributors
AURA
Non Fed Funds
X
X ?
?
NSF
NSF
Science Advisory Committee (SAC)
LSST Construction Project
Pre Operations
DOE
U.S. DEPARTMENT OF ENERGY
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Informatics & Statistics
Strong Lensing
Transients & Variable Stars
Science Collaborations
Solar System
Galaxies
Dark Energy (DESC)
Active Galactic Nuclei
Stars Milky Way & Local Volume
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Providing or Administering Financial Support
Funding Source
Advising
Supporting Financially
Member
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