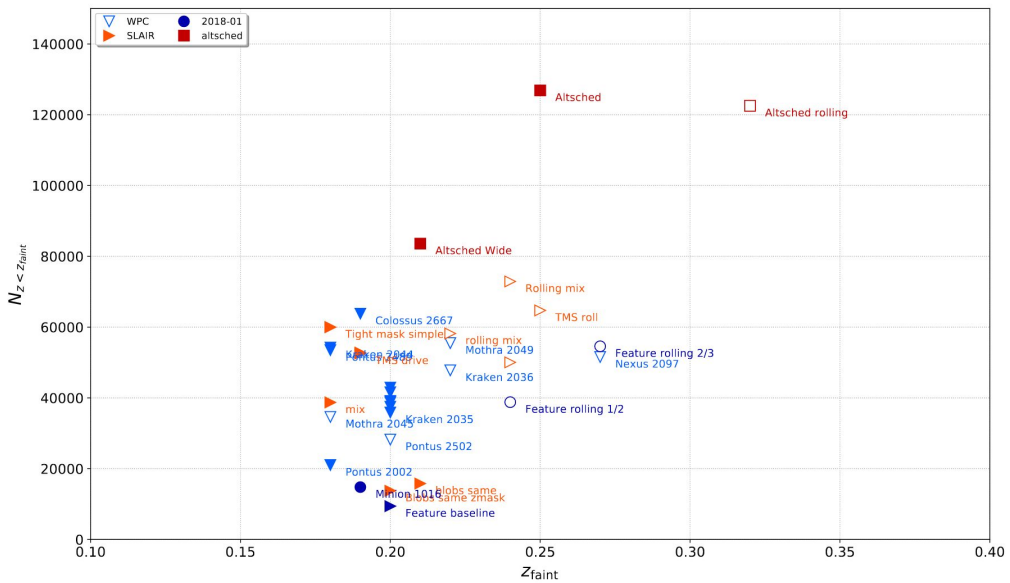
Observing Strategy in LSST - latest news

- **June 2018:** call for white papers giving science cases that LSST could address and suggesting specific observing strategies to optimize that science
- **November 30, 2018:** 46 papers received
- **In DESC:** Observing Strategy Task Force (OSTF) (M.Lochner, D.Scolnic). Two white papers released. *A (DESC) journal article with more details about the metrics will be published soon.*

NSN
z<zfaint



Observing Strategy in LSST - latest news

- **The LSST Science Advisory Committee (SAC) was charged with recommending simulations based on these (46) white papers.**
- **These simulations will be used as input for making decisions on the LSST observing strategy.**
- **Supposed to be an iterative process: OpSim team will make simulations available to the LSST science community and the results will inform decisions about refined simulation experiments.**
- **OpSim runs announced on https://community.lsst.org/c/sci/survey-strategy**
- **SAC report: *A Report from the LSST Science Advisory Committee: Recommendations for Operations Simulator Experiments Based on Submitted Cadence Optimization White Papers (April 2019)***

- **These simulations will be performed with a new version of the OpSim simulator (compared to white paper contributions).**

Observing Strategy in LSST - Main proposal from the SAC - WFD

Footprint	Exposure	Filters/ revisit per night
❑ Original: -62˚ ≤ δ ≤ +2˚ ❑ Extended:72˚ ≤ δ ≤ +12˚	❑ 2x15s (“snaps”) ❑ 1x30s(no snaps) ❑ Short expos(1s, 5s) ❑ Adjusted expos.	❑ No restriction on the second visit filter ❑ Filter second visit ≠ filter first visit ❑ r(first) -> r(second) ❑ g(first)->i(second)+g following night ❑ “Presto” : pairs within 0.5 hours (g&i or r&z) + one obs in one of these later in the night

Cadence	Season length

❑ Universal
❑ Rolling
  ❑ Two halves
  ❑ Three parts
  ❑ Six parts
	❑ Increase season length (modify OpSim optimized algo?)

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SN assessment (at first sight)

😋 happy

😞 not so happy

😐 not sure

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Observing Strategy in LSST - Main proposal from the SAC - DD

- Dithering
- Cadence : only two proposals retained

Long seasons (more than 6 months)

- "Rolling cadence":
  - gri and zy interweaved every 3 days
  - 2,4,8,25,4 visits in grizy
  - No recommendation for u-band
- Expected budget: ~ 6.2%

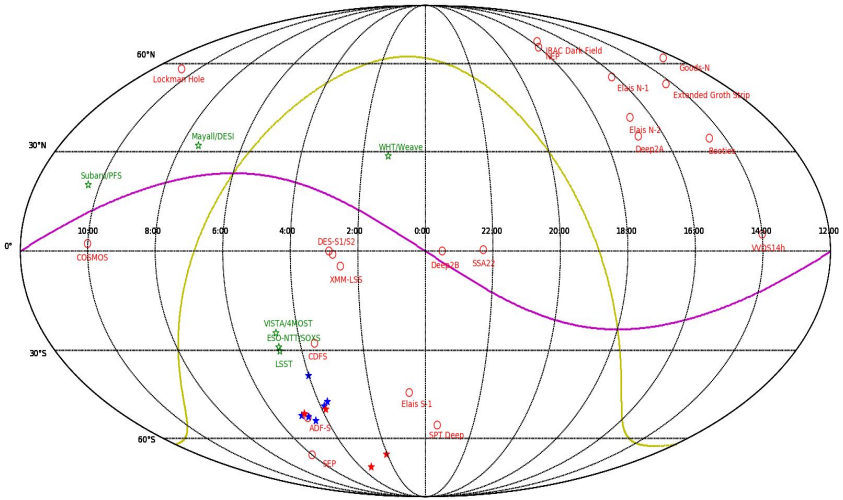
DESC

- ugrizy observations every two days
  - 4,1,1,3,5,4 visits in grizy
  - u-band: important for active galactic science
- Expected budget: ~3.4%

AGN

SAC suggestion: "hybridized" DDF program:
AGN some years, DESC others.

- Location
  - 4DDFs already committed:
    - COSMOS, XMM-LSS, ELAIS-S1, CDFS
  - One additional DDF (synergy with EUCLID/WFIRST)
    - α,δ = 04:44:00, -53:20:00
  - 5 additional DDFs requested by Solar System Science
    - (ecliptic longitude, high galactic latitude)



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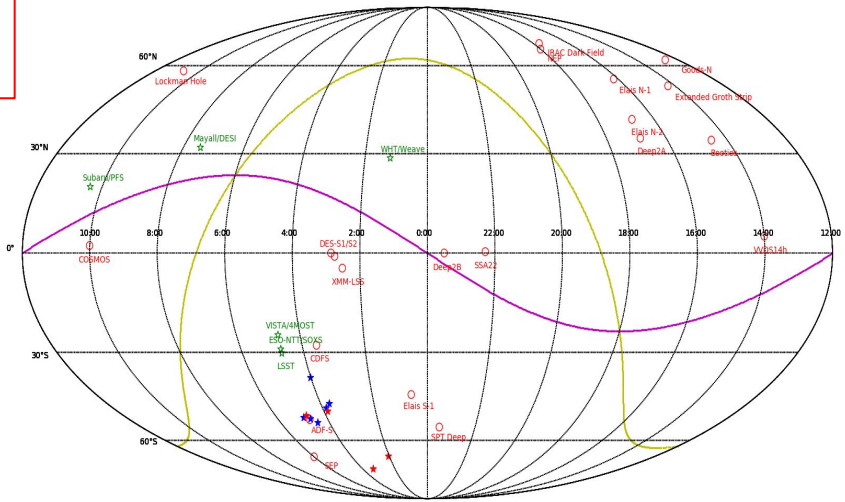


Observing Strategy in LSST - DESC-SN plan

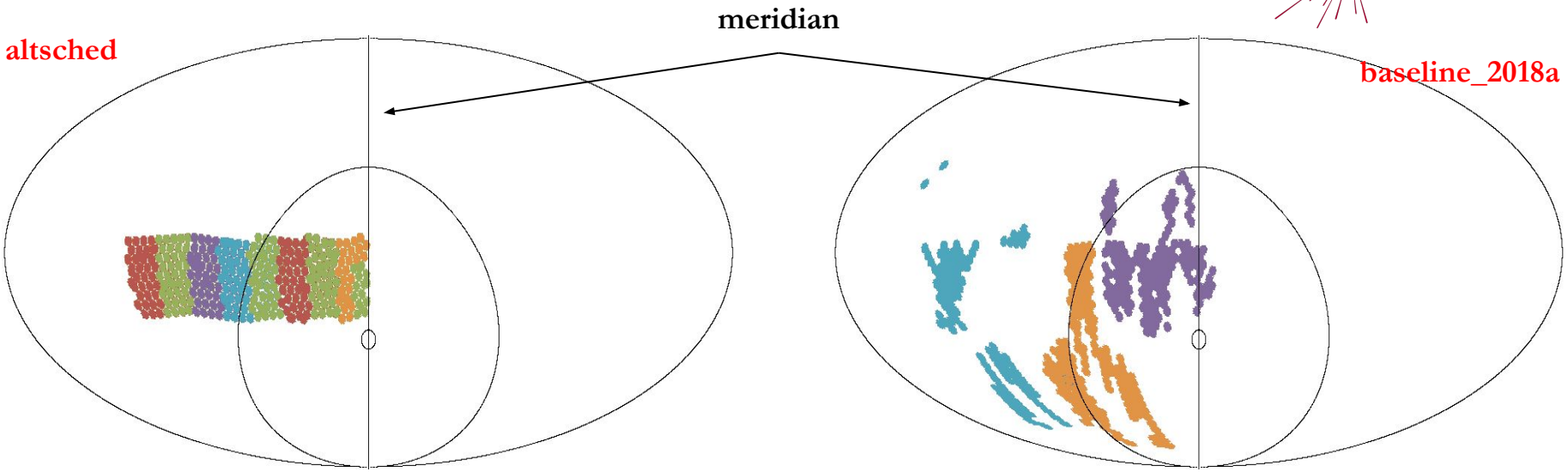
- Assess new strategies wrt SN science using a set of metrics:
  - Number of well-sampled SN/Completeness
  - Detection rate
  - Redshift limit
  - FoM (w0, wa)
  - Early classification
  - Photometric classification
  - Peculiar velocity
  - …
- "Fast" metrics will be implemented (some are already) in the Metric Analysis Framework (LSST): set of metrics used by the project to estimate performance of cadences wrt science case

  -> Important to show LSST what the impact of cadence is on SN science.

- All metrics will be included in the Survey Strategy Support pipeline, a DESC simulation pipeline for SN.
- An optimisation of the DDF survey will have to be done.

Backup

Altsched vs OpSim - two different ways of observing the sky



End of a night

Easier to have a regular cadence

Altsched : systematic scan of a pre-defined region with a high number of filter changes per night
OpSim: "greedy" algorithm ; local optimal choice + slew time minimization.

Altsched vs OpSim - Filter changes per night

Larger number of filter changes per night with altsched

median	12	2
min	2	0-2
max	18	11-20

OpSim