

Ongoing DECam surveys



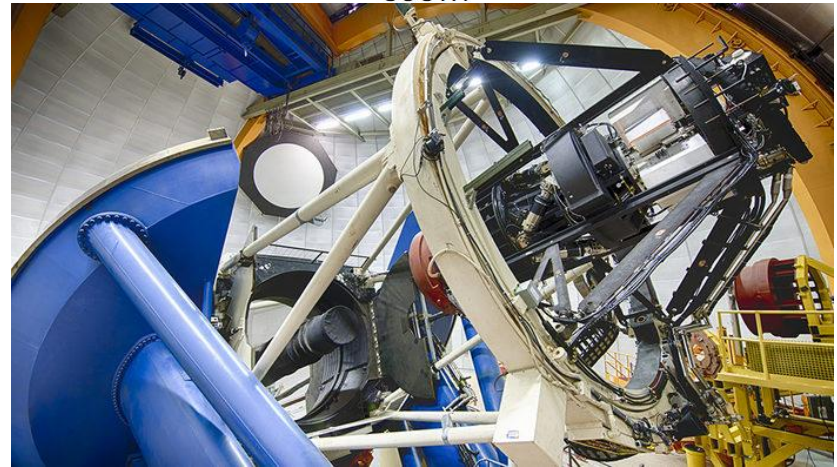
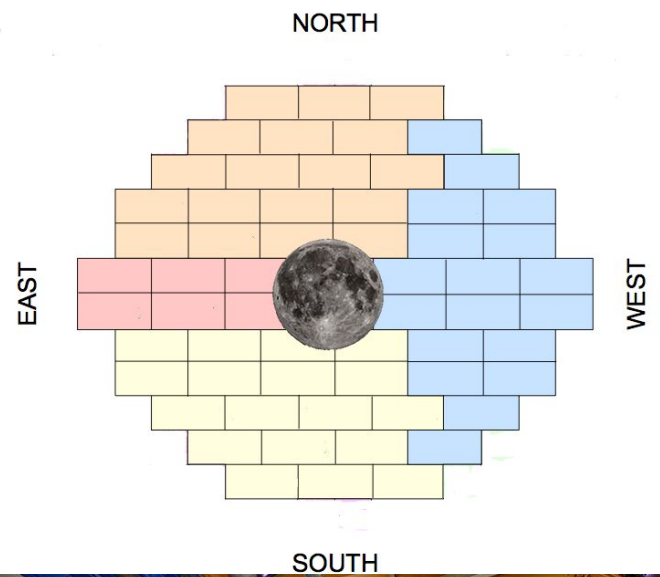
Alfredo Zenteno

Cerro Tololo Inter-American Observatory, La Serena, Chile

April 24, 2018

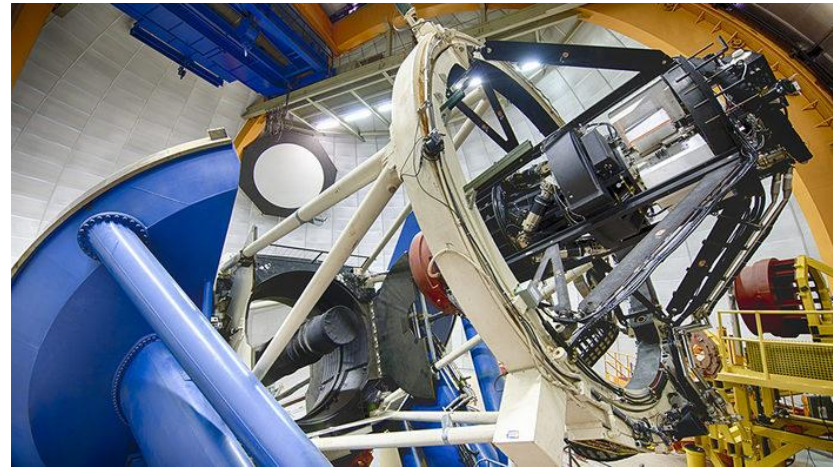
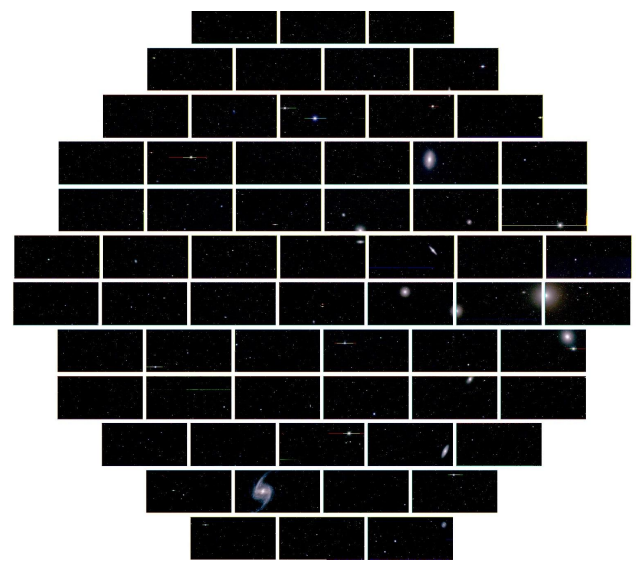
Dark Energy Camera

- 570 Mpixels
- 62 science CCDs
- $0''.263$ per pixel
- FOV: 2.2 deg, 3 deg²
- *ugrizY* filters (+VR, N964, and N662)
- Blanco 4m telescope

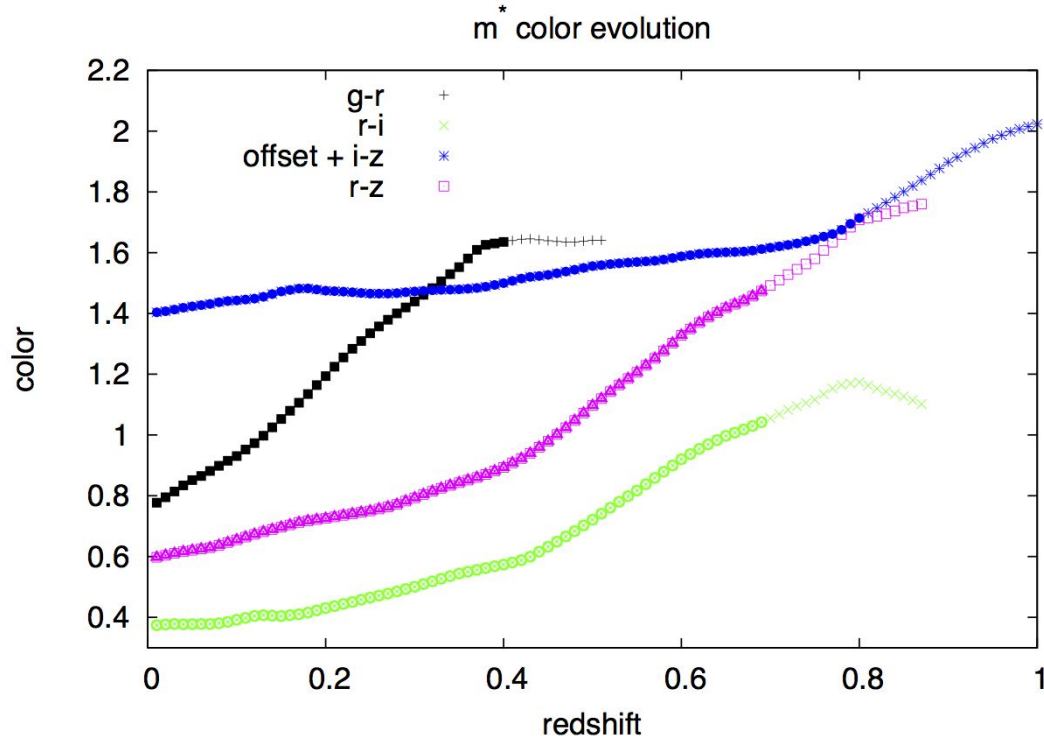


Dark Energy Camera

- Depth requirements for eROSITA photo-z
- MagLite I and II
- DECaLS + Blink
- DES
- BLISS
- DECam eROSITA Survey



Depth requirements

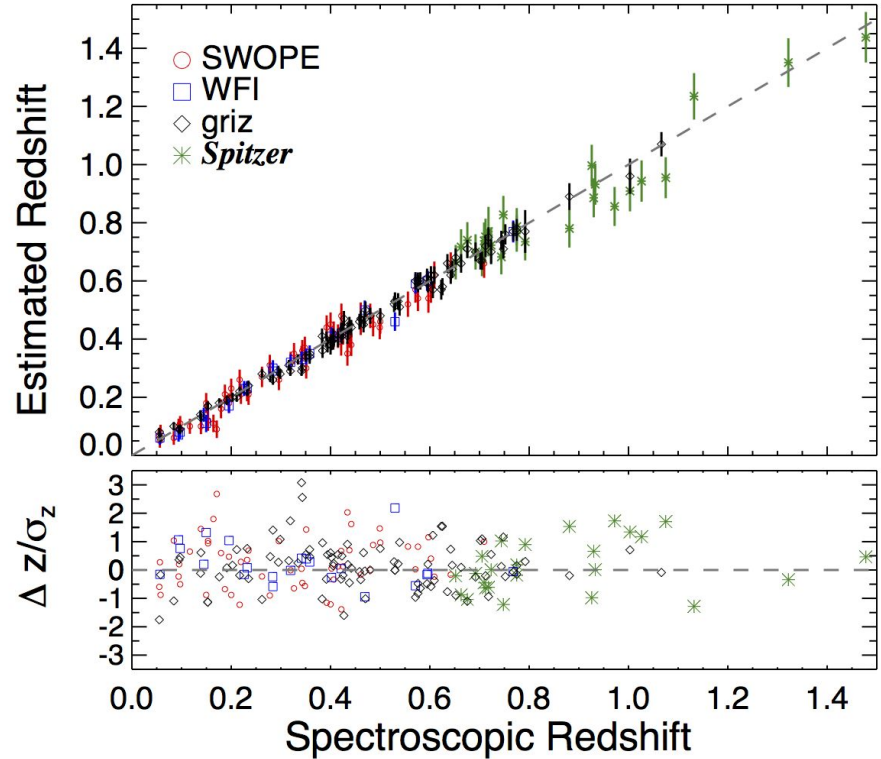


- Red sequence photo-zs: griz
- Passively evolving stellar population model $\rightarrow m^*$
- m^*+1 :
 - $g=22.2, r=23, i=22.4, z=21.9$ (to $z=0.8$ at 10 sigma)
 - $t_g=90s, t_r=160, t_i=110s, t_z=140s$
 - 100 deg² in griz under 8 hours.

Depth requirements

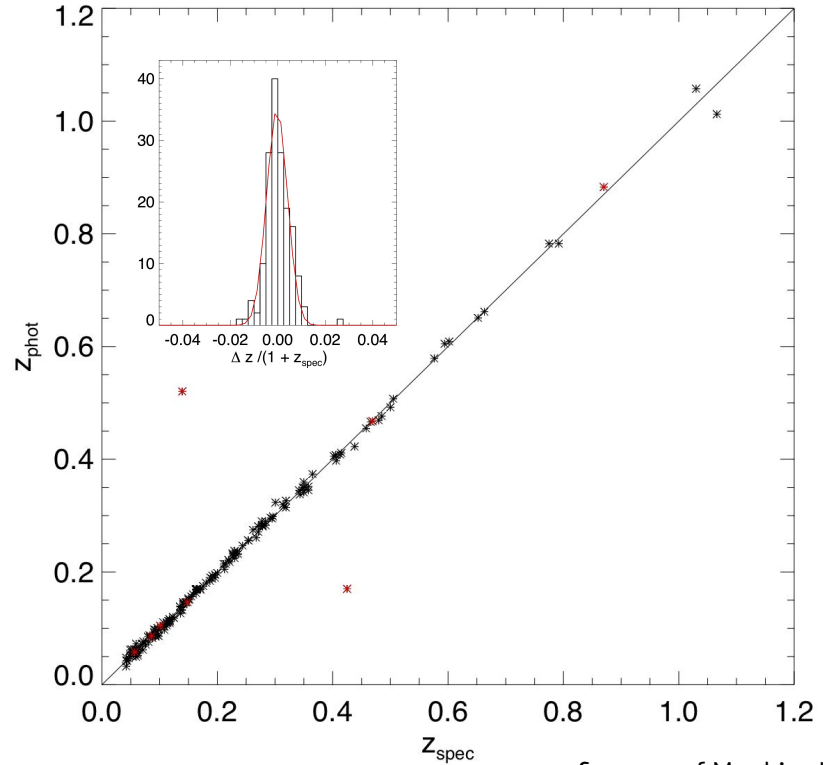
- Red sequence photo-zs: griz
- Passively evolving stellar population model:
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(m_{red}^*+1 to $z=0.8$ at 10 sigma)
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 - 100 deg² in griz under 8 hours.
- SPT followup

Bleem et al. (2015)



Depth requirements

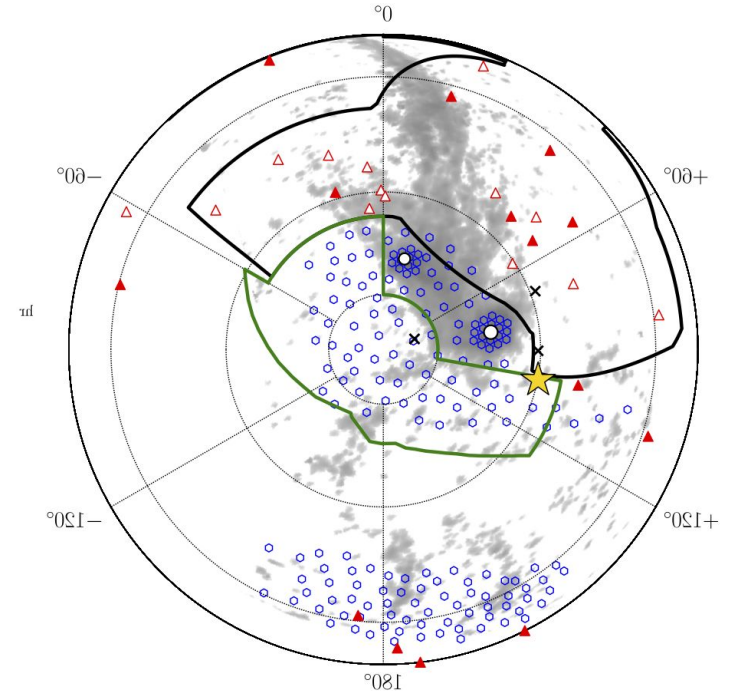
- Red sequence photo-zs: griz
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 - $t_g=90s, t_r=160, t_i=110s, t_z=140s$
 - 100 deg² in griz under 8 hours.
- Matthias K. photoz will do even better



Courtesy of Matthias Klein

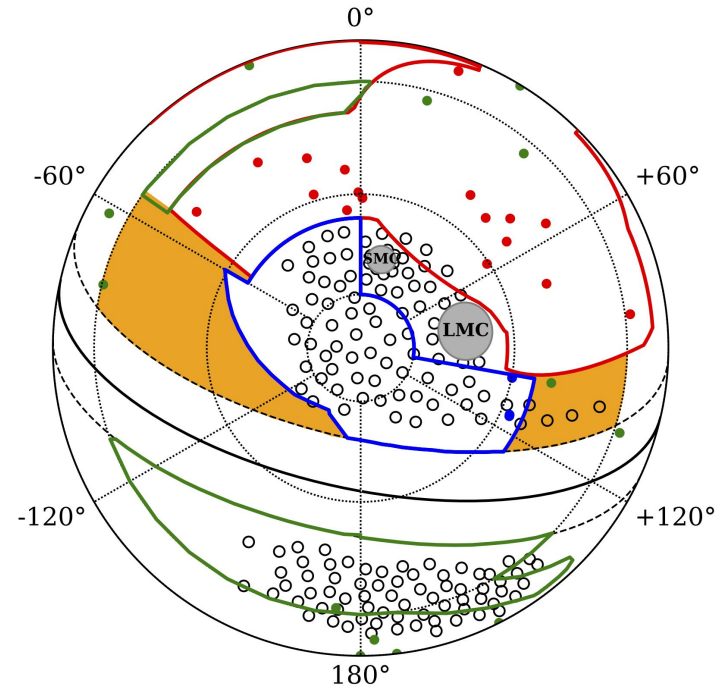
Surveys: “Magellanic Satellites Survey: The Search for Hierarchical Structures within the Local Group”

- MagLite I. PI: Keith Bechtol
- 12n, 2016A & 2017A
- 3x90s in *gr*
- 1300 sq-deg
- To search for ultra-faint galaxies and other low-surface-brightness stellar substructures associated with the Magellanic system
- Proprietary time: 1 Yr. (June 2018)
- Drlica-Wagner et al. (2016)



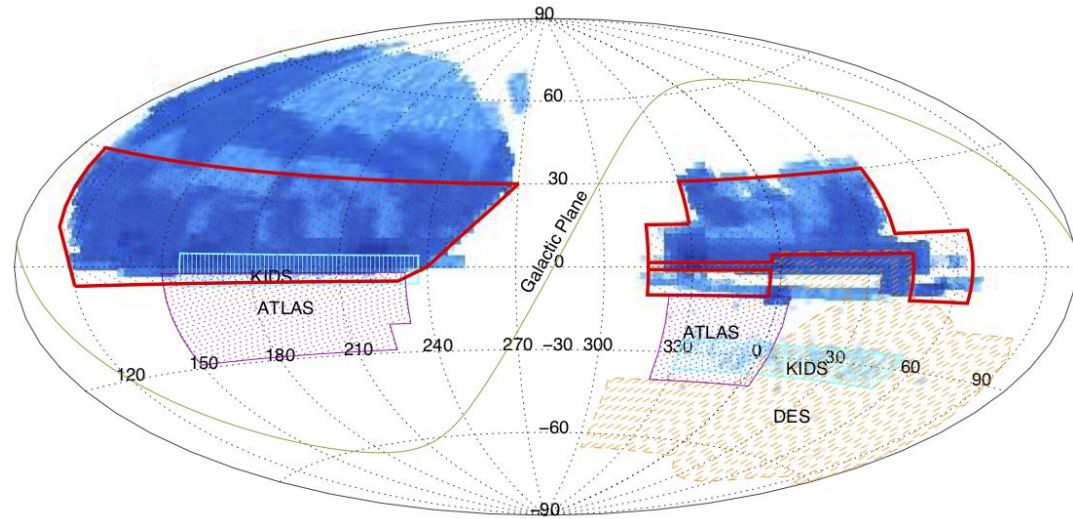
Surveys: “Magellanic Satellites Survey: The Search for Hierarchical Structures within the Local Group II”

- MagLite II. PI: Keith Bechtol
- 4n, July 2018A, ?n 2019A
- 3x90s in *gr*
- 1300 sq-deg
- To search for ultra-faint galaxies and other low-surface-brightness stellar substructures associated with the Magellanic system
- Proprietary time: 1.5 Yr. (Jan 2020)



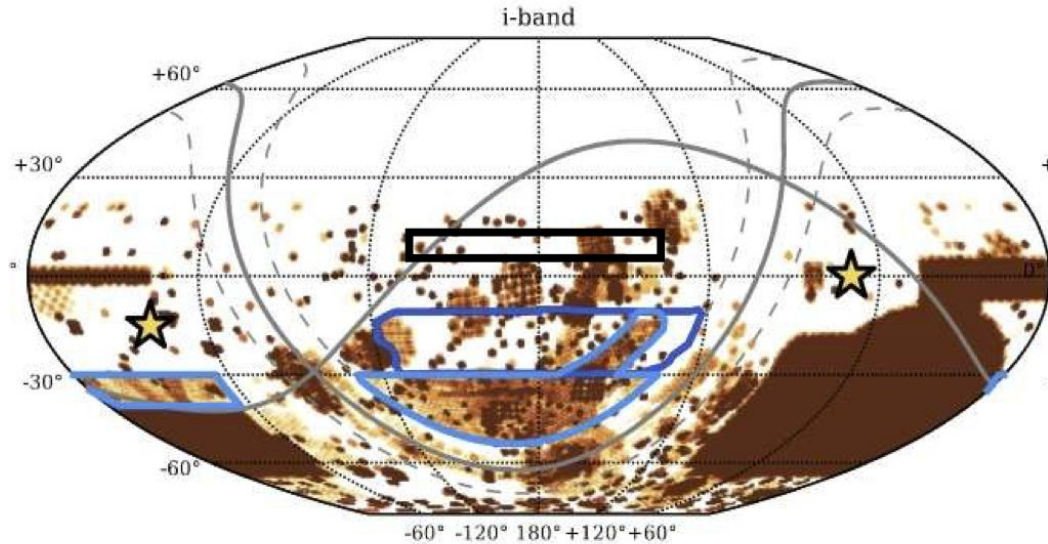
Surveys: “The DECam Legacy Survey of the SDSS Equatorial Sky (DECaLS)”

- PI: David Schlegel & Arjun Dey
- 157n (2014A-2018B)
- Decl. < 34 deg (NGC) & Decl. < 32 deg (SGC) . 9000 deg²
- 166s, 134s, and 200s in g, r, z.
- $g=24$, $r=23.4$, $z=22.5$ at 5sigma
- To provide targets for DESI
- Proprietary time: none



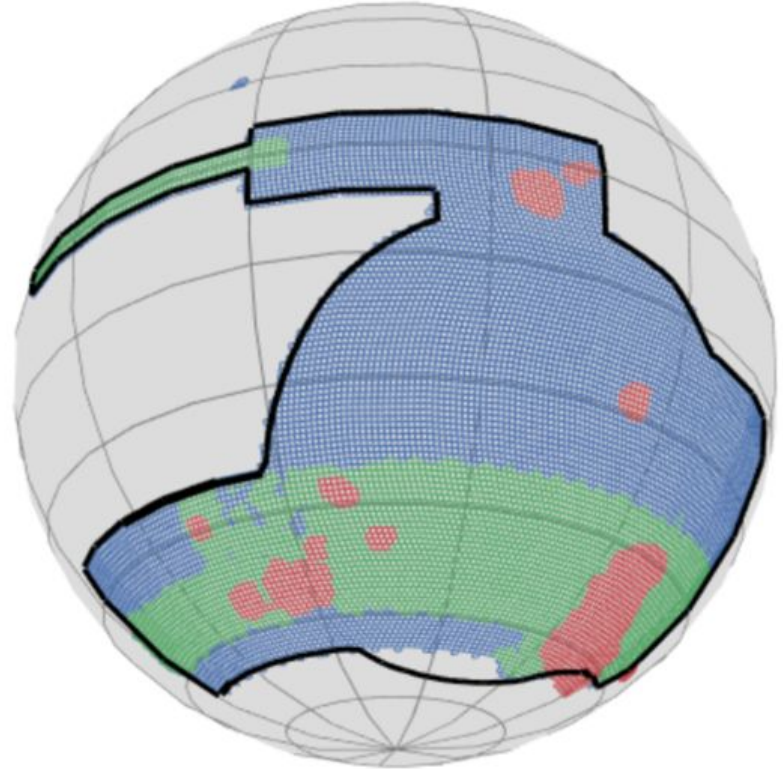
Surveys: "Blanco i-band Kilo-degree Survey (Blink)"

- PI: Martin Makler
- 3n
- 600 deg²
- 3x90s *i-band*
- Follows the DECaLS footprint, partially
- Galaxy Clusters, Strong lensing, Transition galaxies, and Lyman break analogs.
- Proprietary time: 1.5 yrs. (Oct 2019)



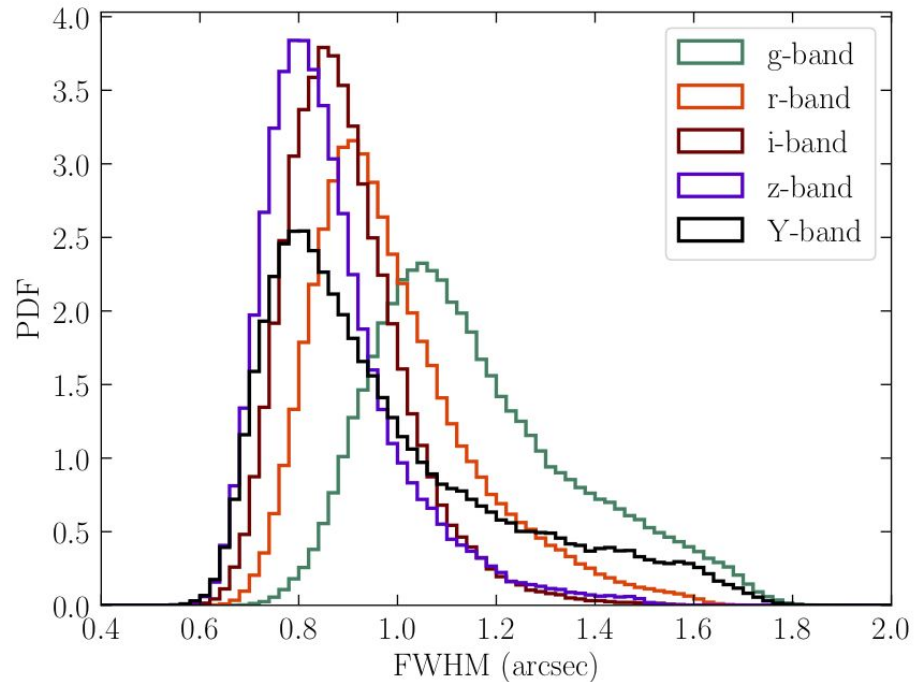
Surveys: “Dark Energy Survey (DES)”

- PI: Josh Frieman
- +525n (2012B-2018B)
- 5000 deg²
- *grizY* (90s in griz and 45s in Y)
- Cosmological probes
- Proprietary time: 1 Year



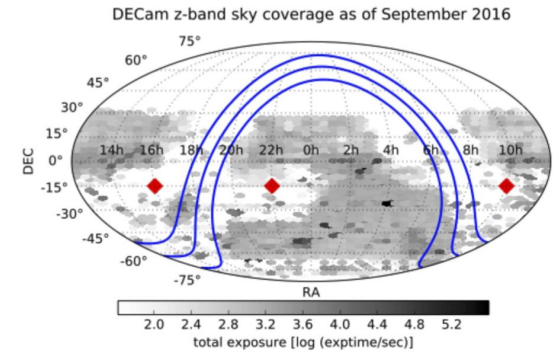
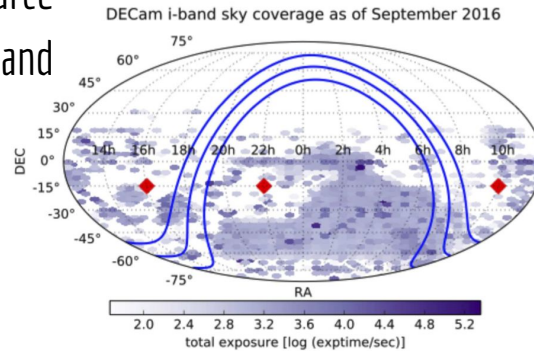
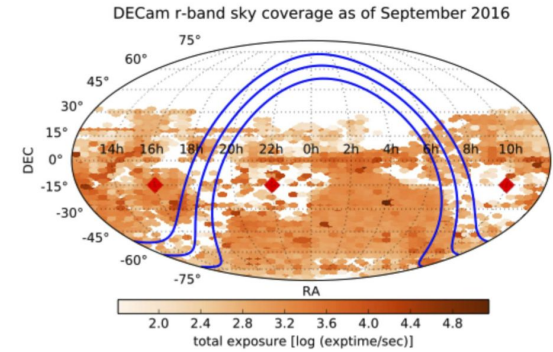
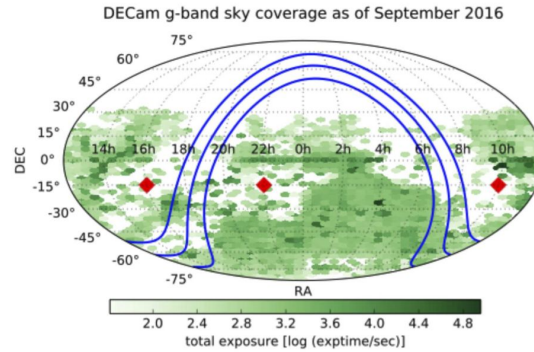
Surveys: “Dark Energy Survey (DES)”

- DR1: 345n
- Median PSF:
 - $g=1.12''$, $r=0.96''$, $i=0.88''$, $z=0.84''$, $Y=0.90''$
- Depth
 - $g=24.33$, $r=24.08$, $i=23.44$, $z=22.69$, $Y=21.44$
- 310M galaxies, 80M stars
- Abbott et al. (2018)
- <https://des.ncsa.illinois.edu/releases/dr1>



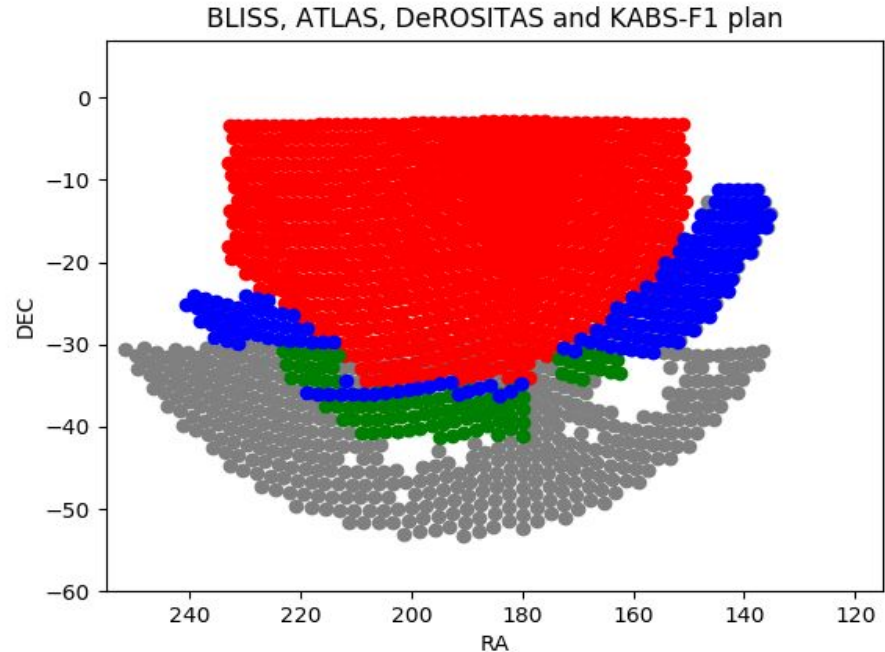
Surveys: “Blanco Imaging of the Southern Sky (BLISS)”

- PI: Marcelle Soares-Santos
- 11.5n
- -1000 deg^2 , $\text{decl} < -30$
- 3x90s *griz*
- Template images for Gravitational Waves source candidates, discovery of Milky way satellites, and search of Planet 9
- Proprietary time: None



Surveys: “DECam eROSITA Survey (DeROSITAS)”

- 5 nights in 2017A:
 - 750 deg² in z band
 - 400 deg² in *gri* bands
- 5 nights in 2018A (starting in 5 days!)
- *griz*
 - $g=22.2, r=23, i=22.4, z=21.9$
 - Constraints: Fill the DE sky!
- As in 2017A we have engaged in collaborative efforts with other surveys to maximize the area coverage and the science return for the time invested



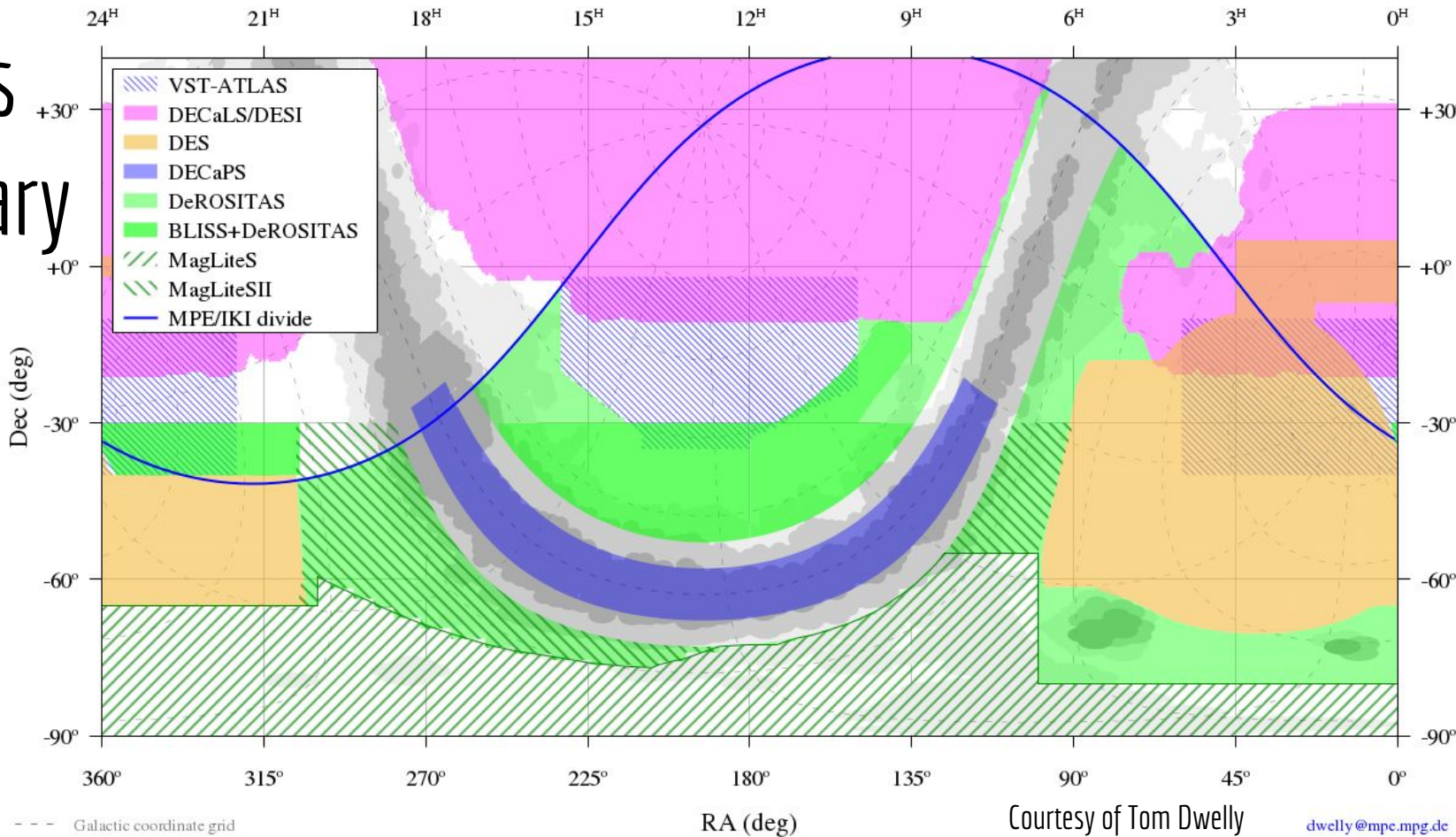
Surveys: “DECam eROSITA Survey (DeROSITAS)”

- 5 nights in 2017A:
 - 750 deg² in z band
 - 400 deg² in *griz* bands
- 5 nights in 2018A (starting in 5 days!)
- *griz*
 - $g=22.2, r=23, i=22.4, z=21.9$
 - $g=23.5, r=23.3, i=22.7, z=22.1$ (obs)
- DECaLS tiling
- Data reduction & photo-zs at Munich Sternwarte (Mohr, Holger, Klein et al.)



Data reduced by Holger Israel

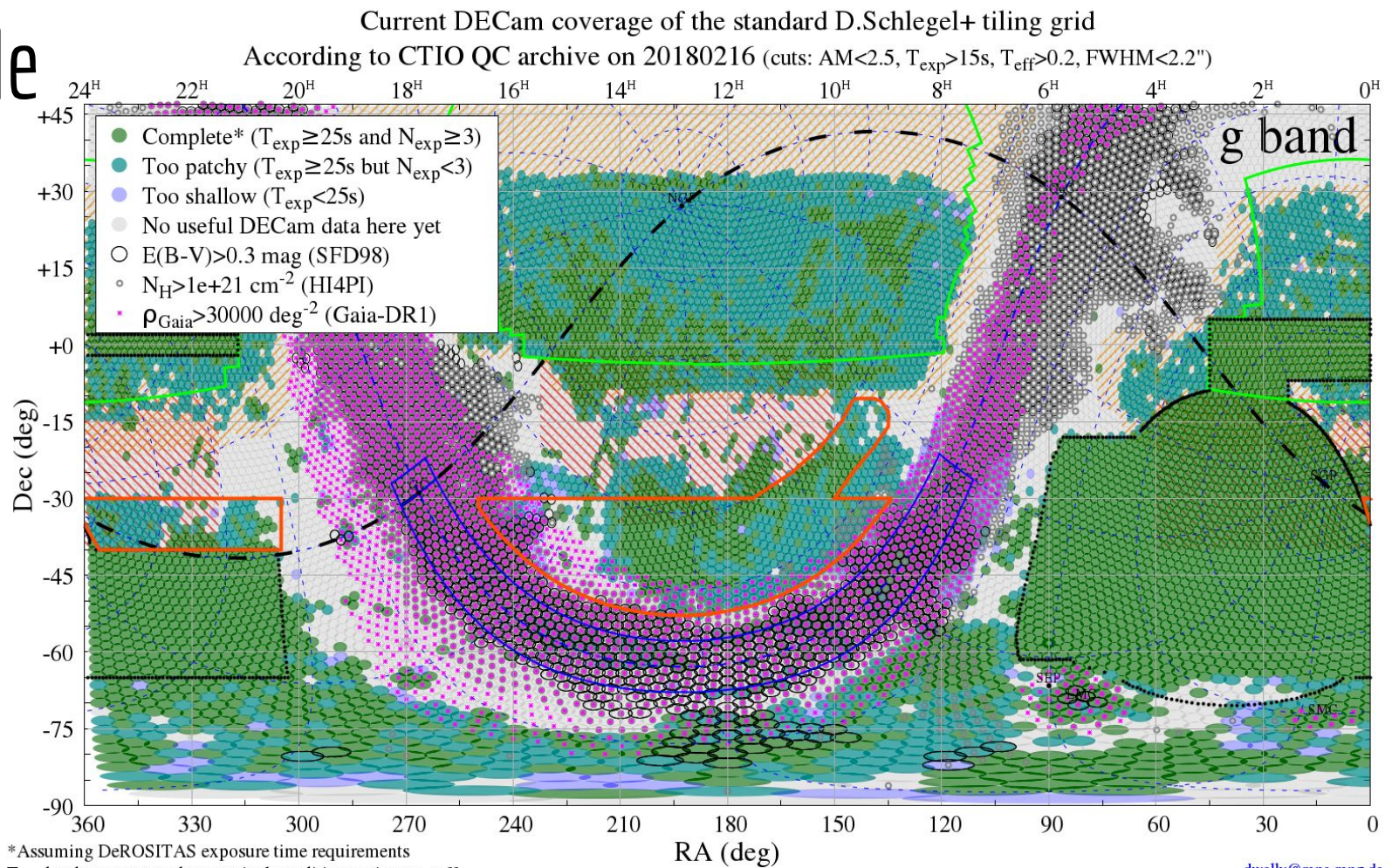
Big Surveys Summary



Courtesy of Tom Dwelly

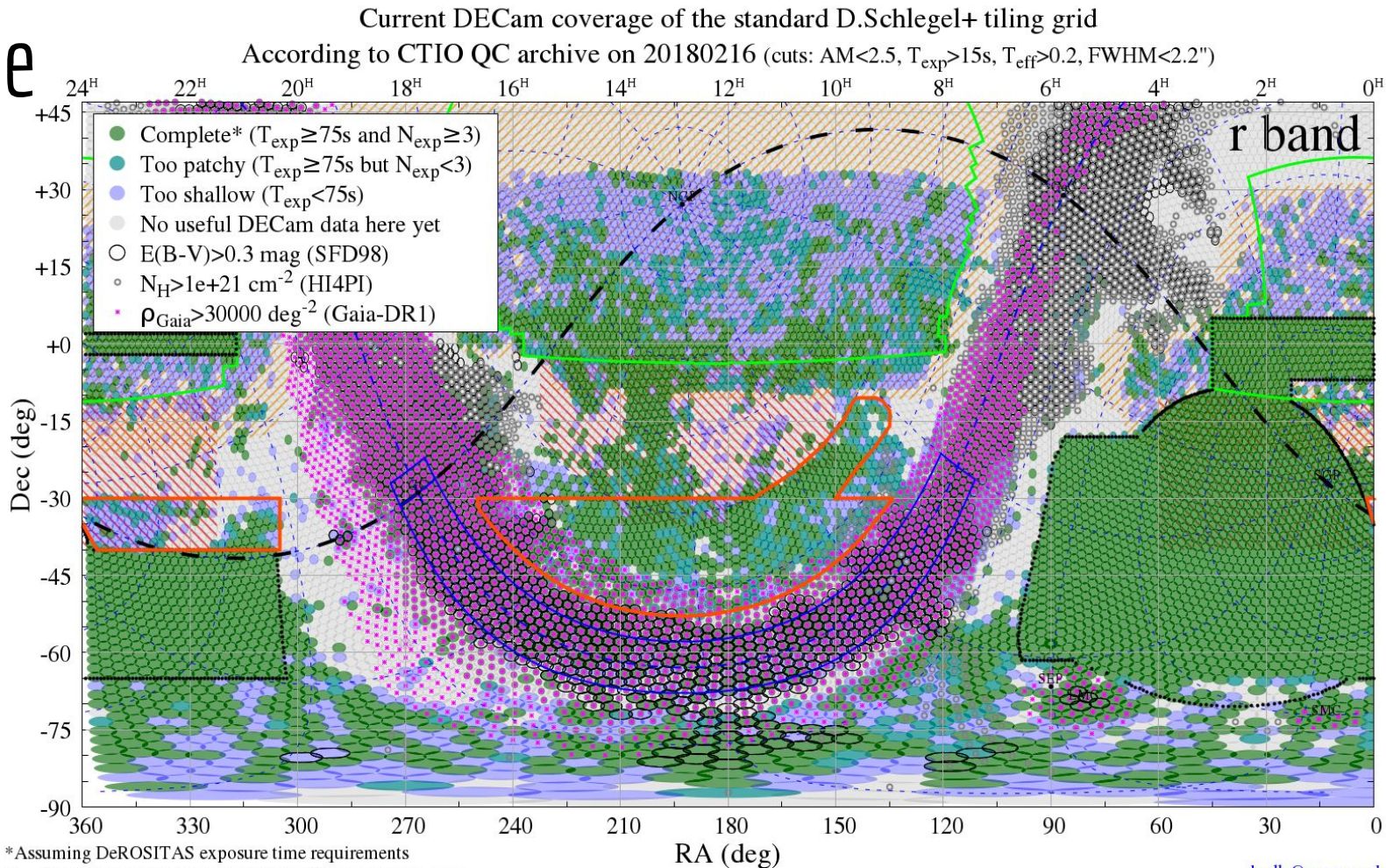
dwelly@mpe.mpg.de

Available Data



*Assuming DeROSITAS exposure time requirements
 T_{exp} has been corrected to nominal conditions using qc_teff

Available Data

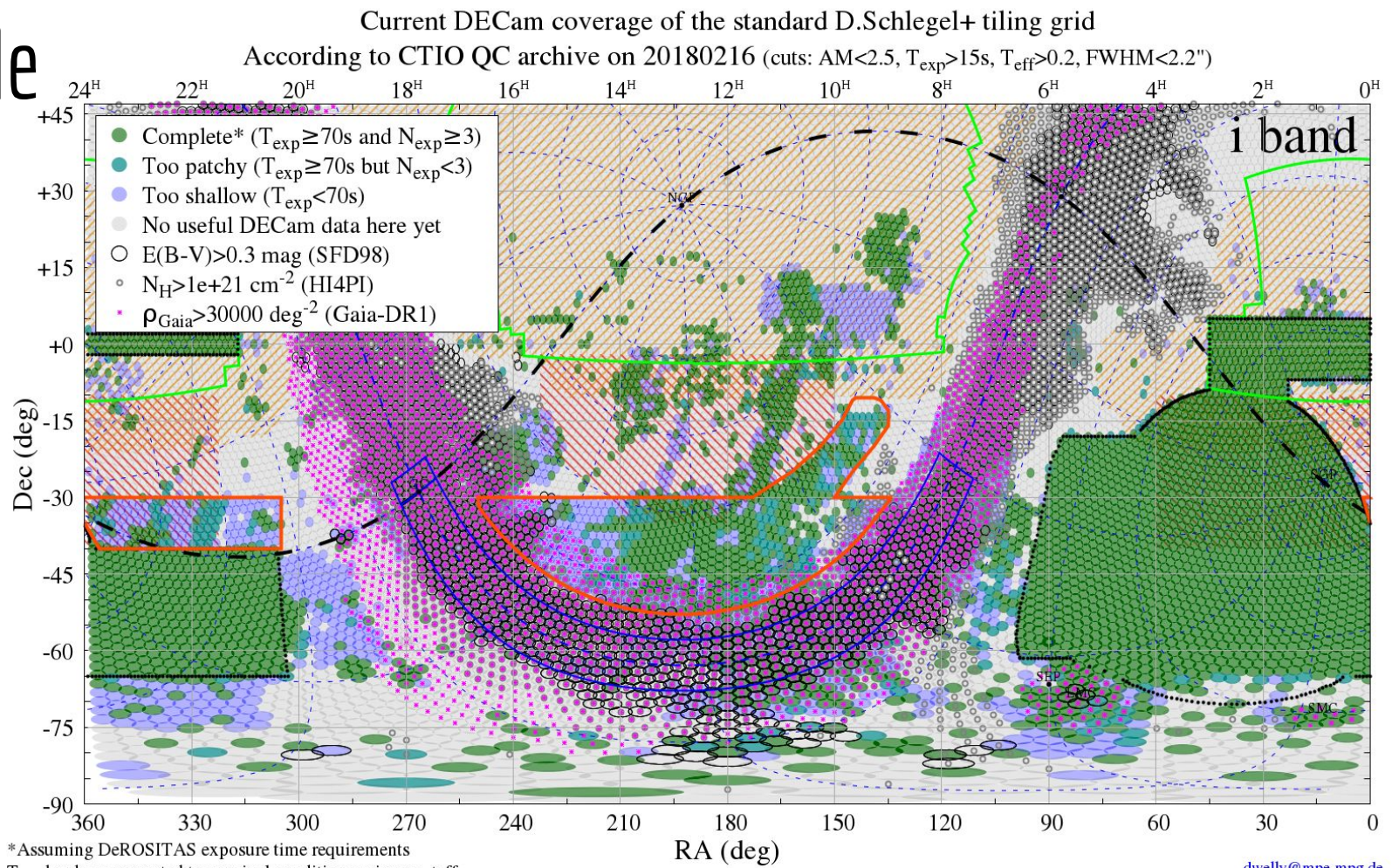


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http://www.mpe.mpg.de/~tdwelly/erosita/DECam_coverage/index.html

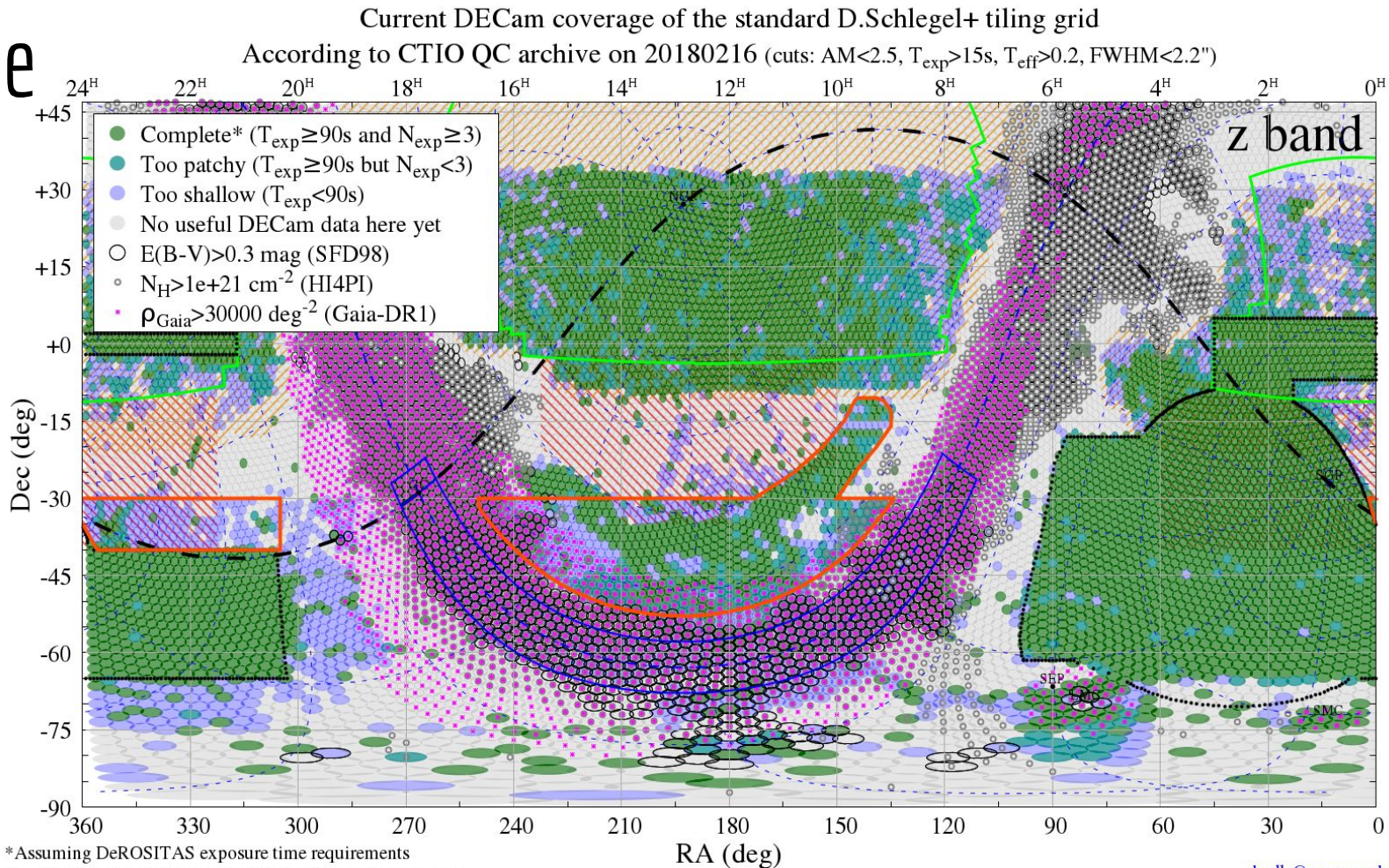
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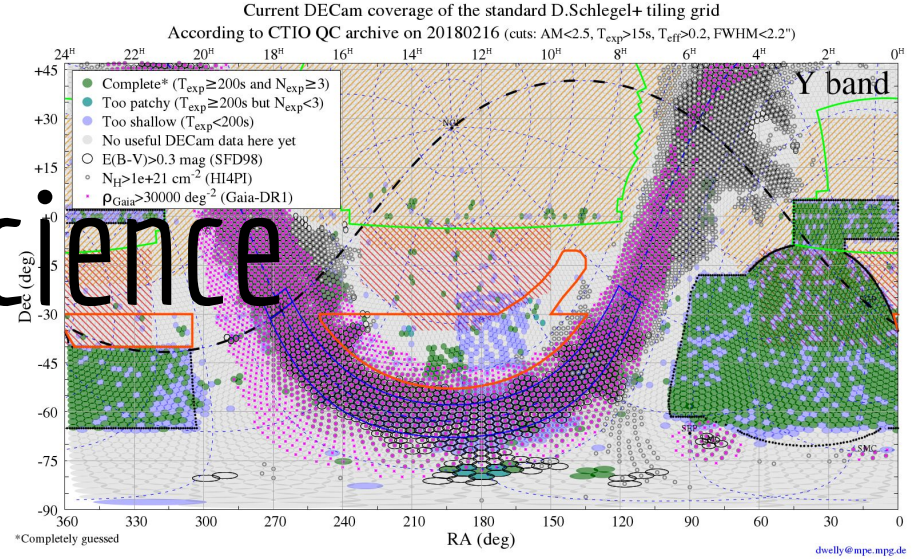
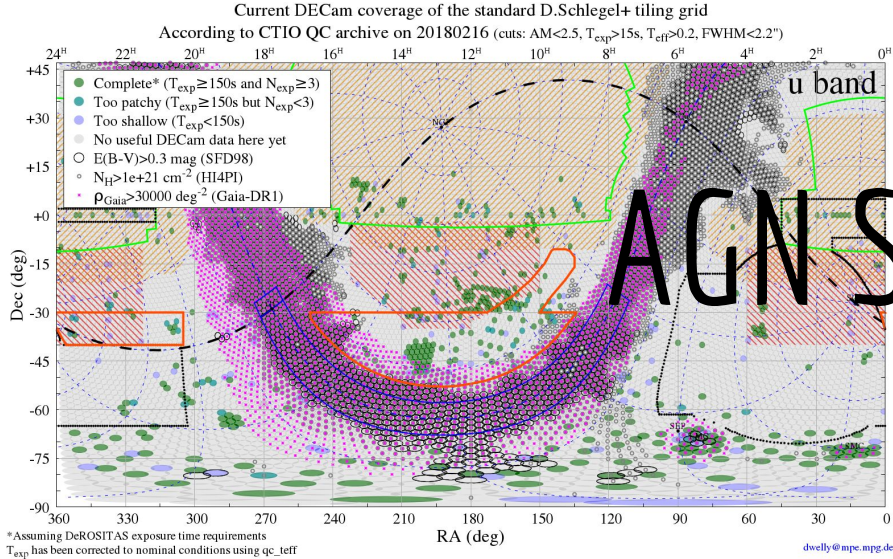


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Surveys: DECam u/Y band...



AGN Science

Barrientos, Shanks et al. (DES area), and Arevalo et al. (NGC; 2 out of the 5n in 2018A for Y) on 2019 on.
More info in Tom's page http://www.mpe.mpg.de/~tdwelly/erosita/DECam_coverage/index.html

What is left to cover the eROSITA-DE Area?

- # Time required to complete 3-dithers g-band= 28 hours
- # Time required to complete 3-dithers r-band= 36 hours
- # Time required to complete 3-dithers i-band= 39 hours
- # Time required to complete 3-dithers z-band= 48 hours
- # Number of nights for the program with 3d griz = 15.1 days (at 10 hours/night)

- # Time required to complete 3-dithers Y-band= 97 hours ($t_u=150s$; $u=22.6$)
- # Time required to complete 3-dithers u-band= 69 hours ($t_Y=270s$; $Y=21.0$)
- # Number of nights for the program with 3d ugrizY = 31.7 days (at 10 hours/night)