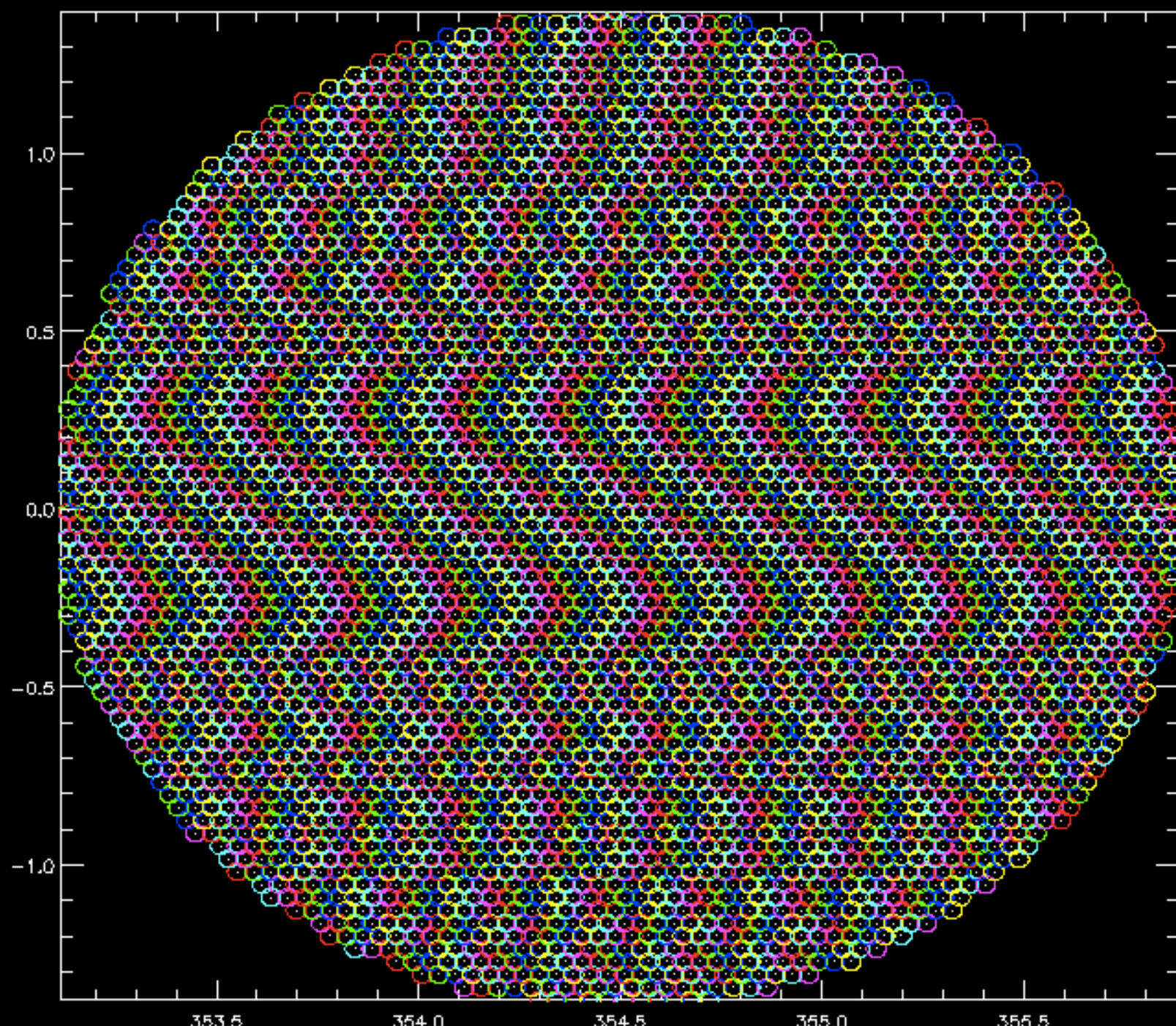
BigBOSS Survey Planning

1. Comments on planning a big survey
   a. *aim for high enough signal-to-noise*
   b. *multi-purpose spectroscopy*
   c. *spend the resources to calibrate*
2. What does a BigBOSS observation look like?
   a. *[apologies in advance: just based on my best understanding of proposal + Mostek docs!]*
   b. *fiber actuator system geometry*
   c. *observations of targets in multiple coverings*
3. What could a BigBOSS survey look like?
   a. *wide field survey*
   b. *WF + medium deep survey*
   c. *WF + targeted fields (clusters, UFDs, etc?)*
   d. *Bright time?*

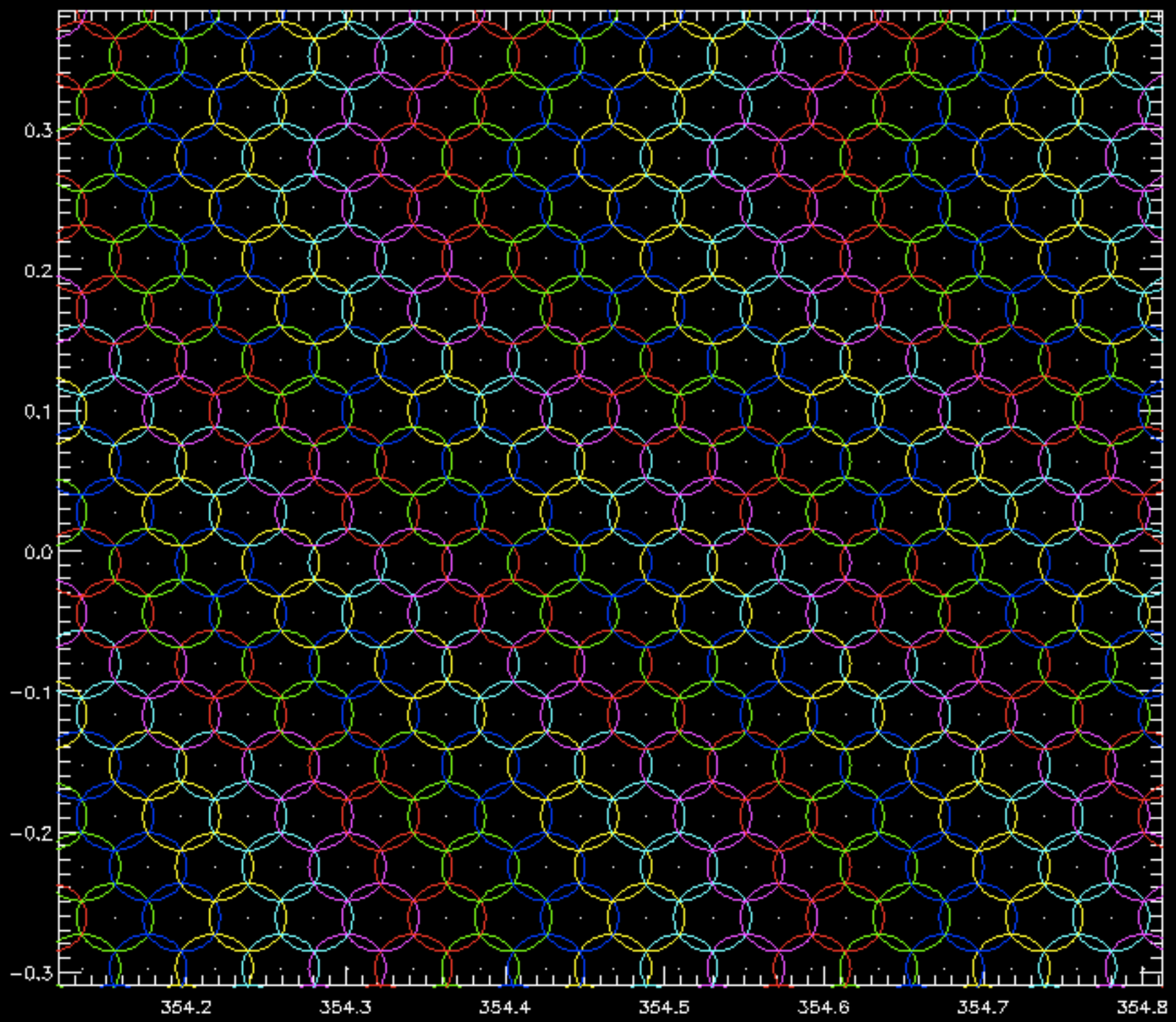
Fiber patrols

In proposal, discuss 15 mm (150 arcsec) separations: 4100 fibers in 1.4 deg field?
"Some extra reach to cover full area" (I find minimum reach has diameter 17.4 mm)



Fiber patrols

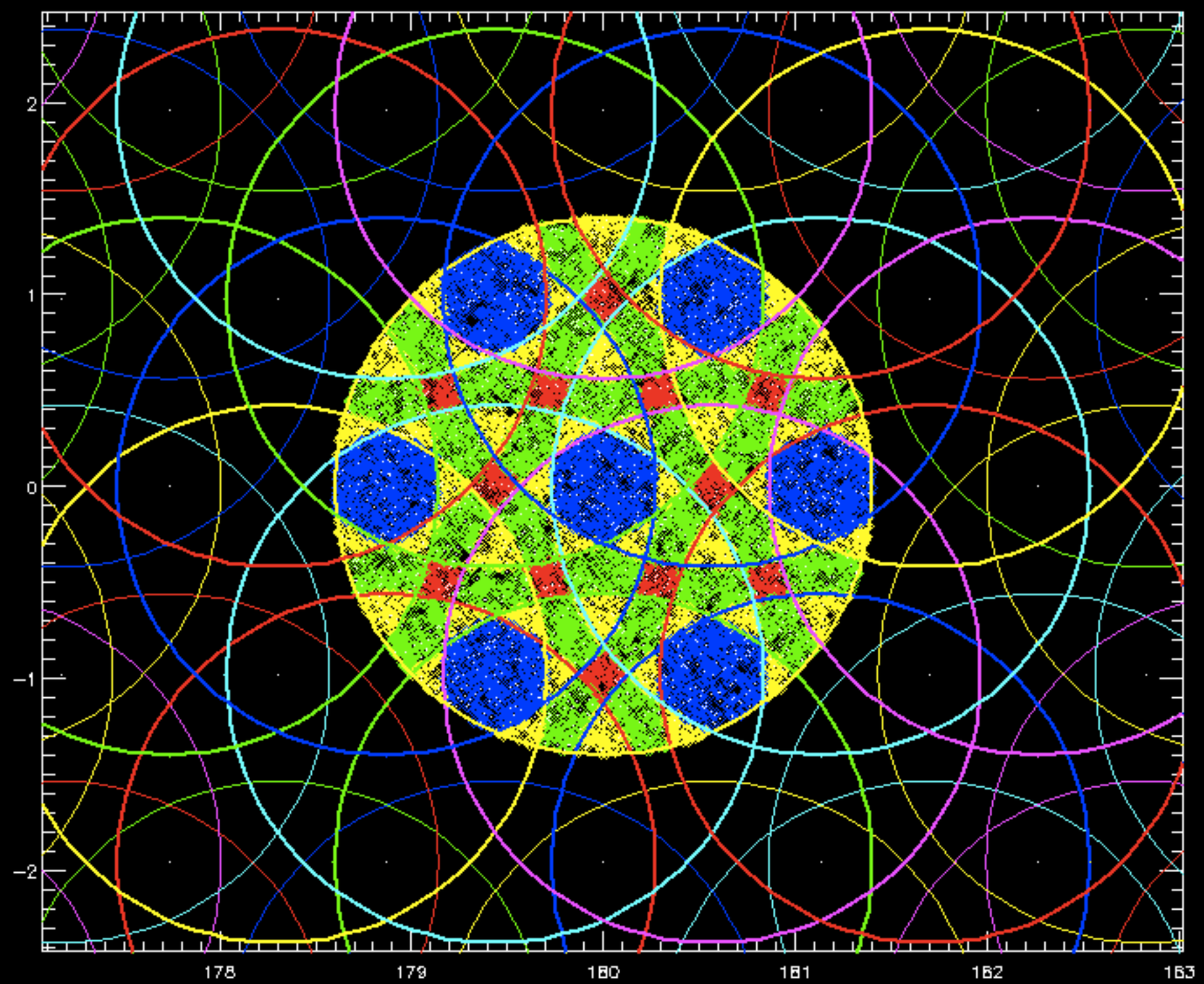
I'm presuming the interface to the hardware will prevent us from accidentally bashing two fiber tips into each other.



Multi-covering strategy

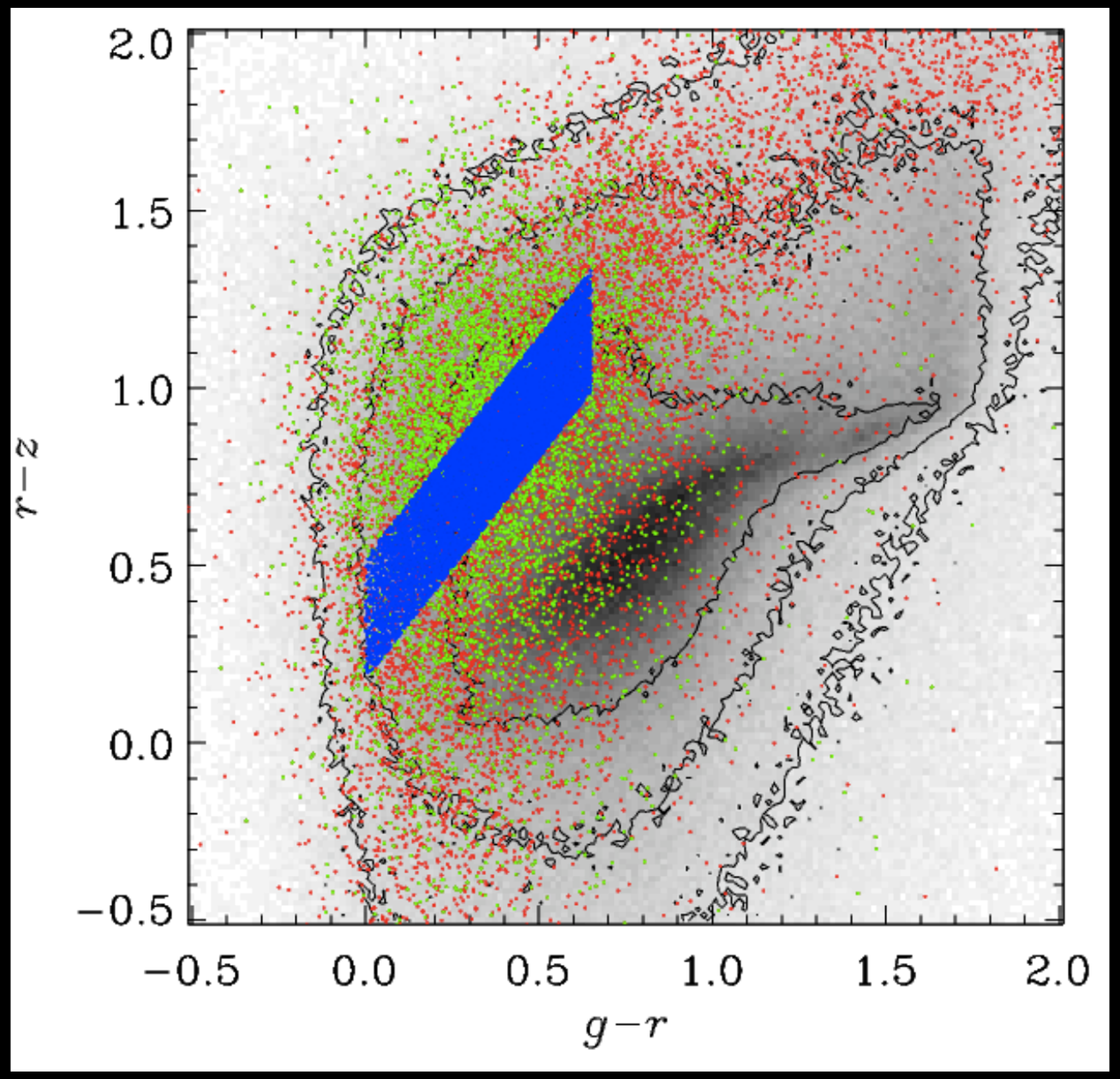
e.g., with spacing of 0.81 times tile size, get 4-7 coverings of sky;
for 1.4 deg radius tiles, that means area per tile = 0.83 sq deg;
with 15 min + 2 min (reposition) + 1 min (repoint) @ 8 hrs/night,
this yields for 90 good dark nights, about 2000 sq deg per year

four
five
six
seven



Multi-covering strategy

let's take some galaxies similar to those to be targeted (just applying something like Nick Mostek's cuts on the SDSS Southern Equatorial Stripe, and some silly LRG approximation)



toss in some QSO + standards randomly, leads to 2500 per sq deg, as quoted by the various posted documents

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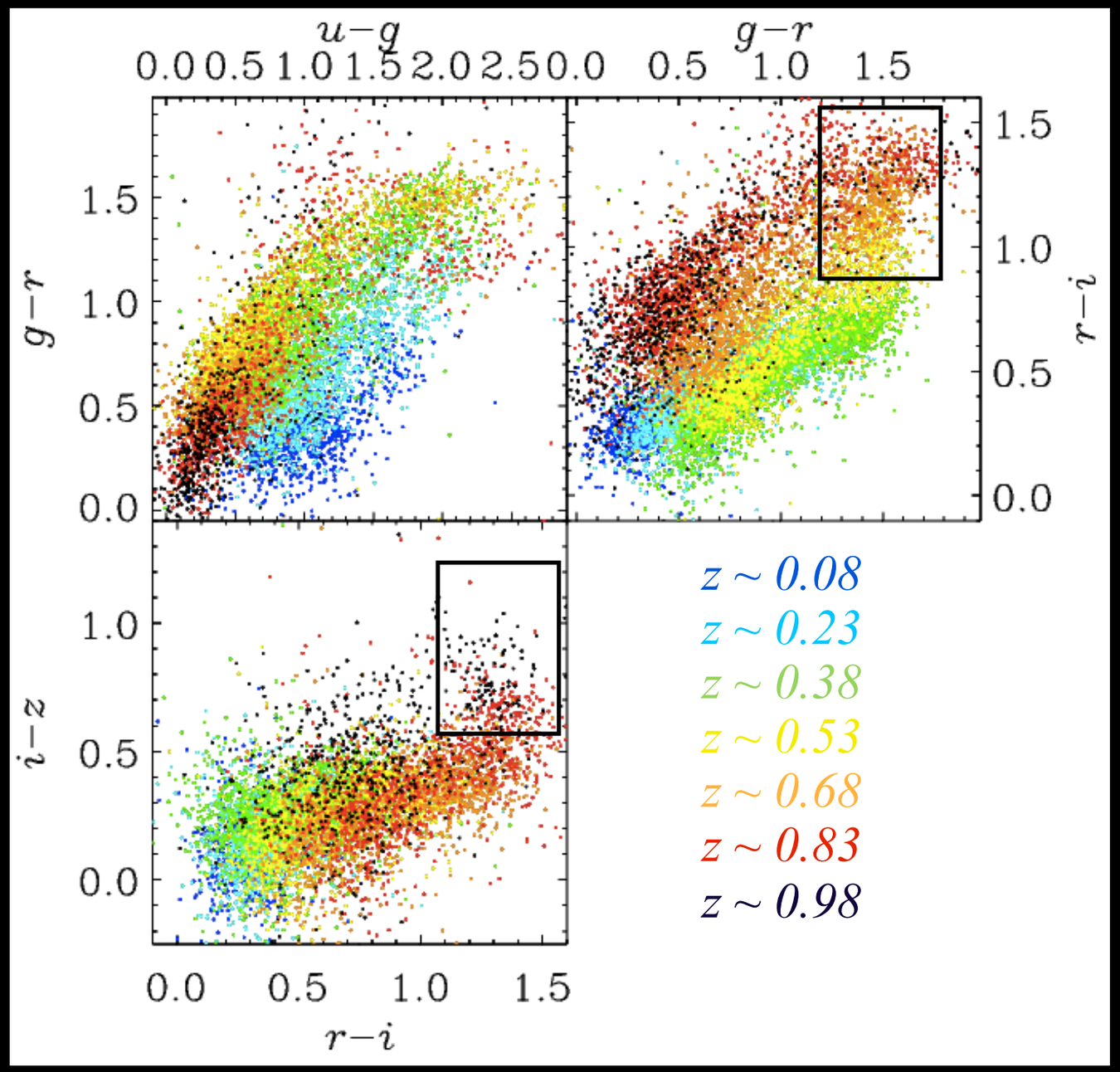


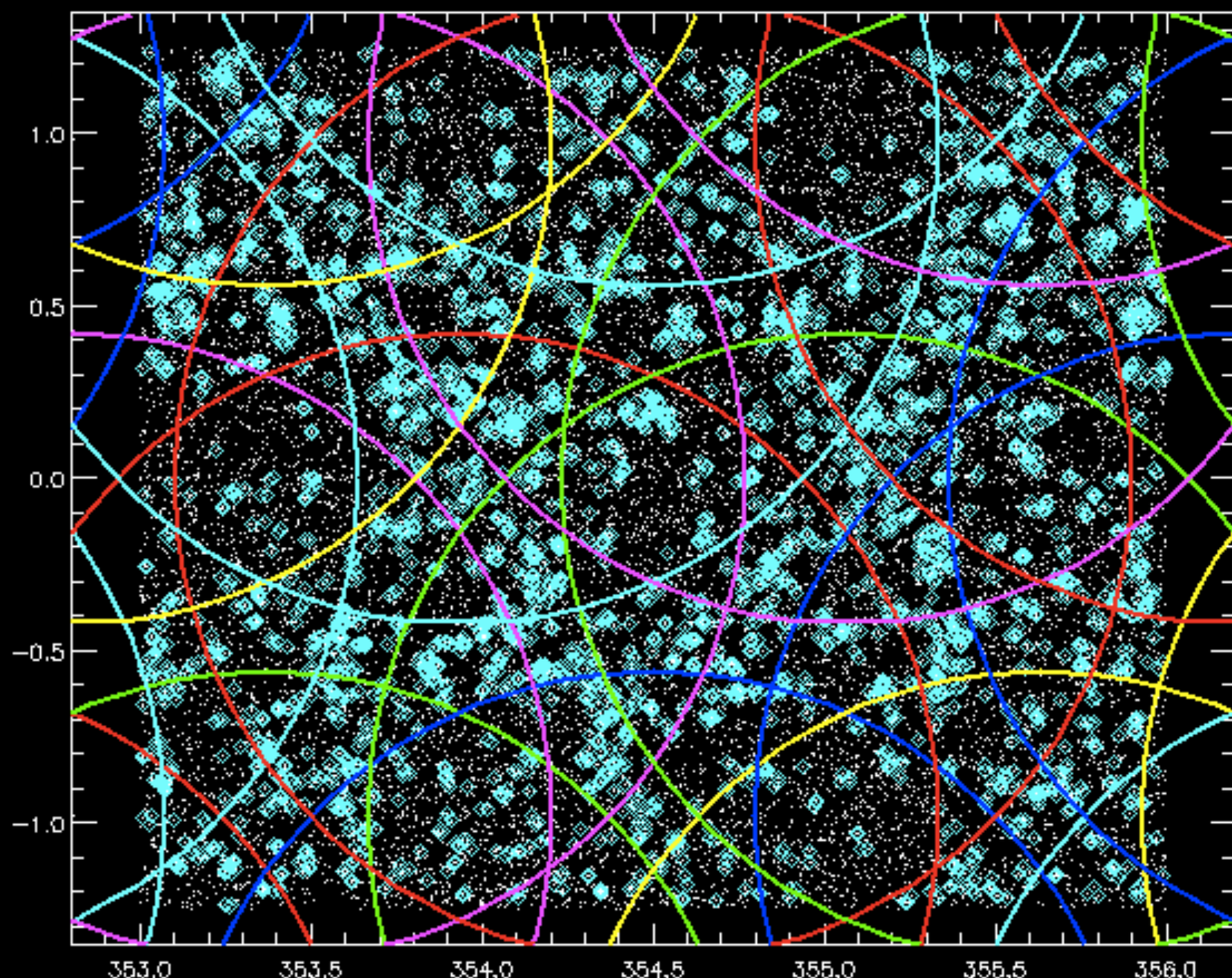
Redshifts courtesy PRIMUS

toss in some QSO + standards randomly, leads to 2500 per sq deg, as quoted by the various posted documents

Multi-covering strategy

require: 1 exposure for ELGs, 2 for LRGs, 6 for standards and QSOs

a simple greedy algorithm yields 80% "completeness"



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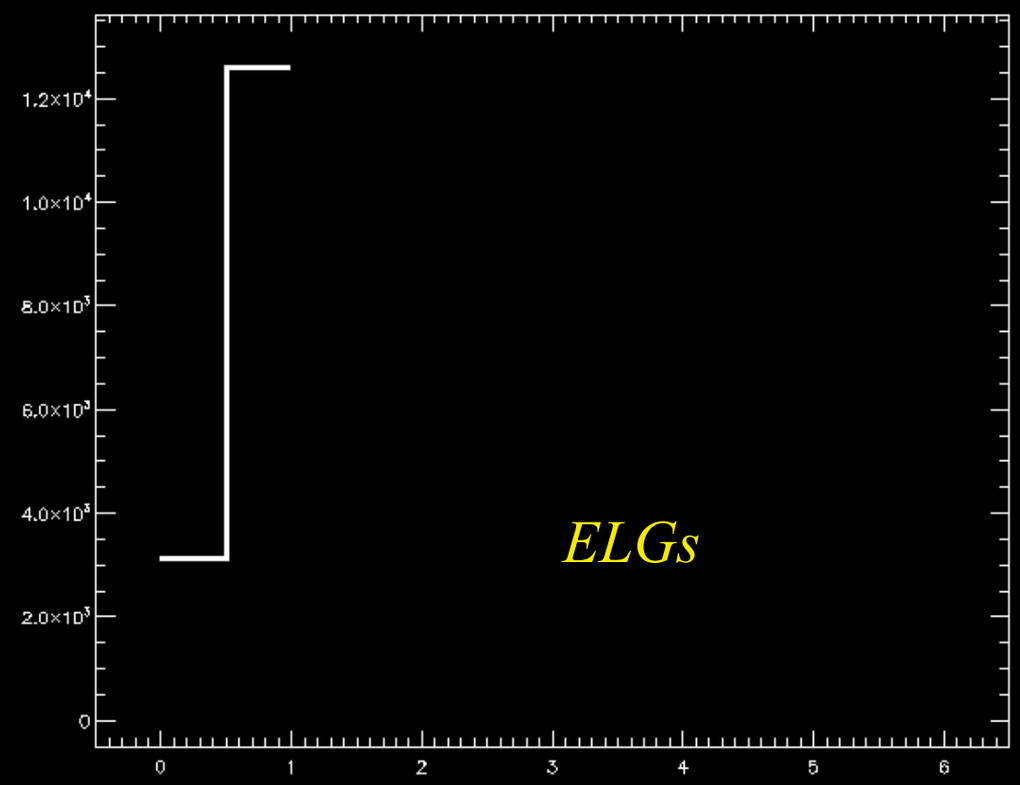
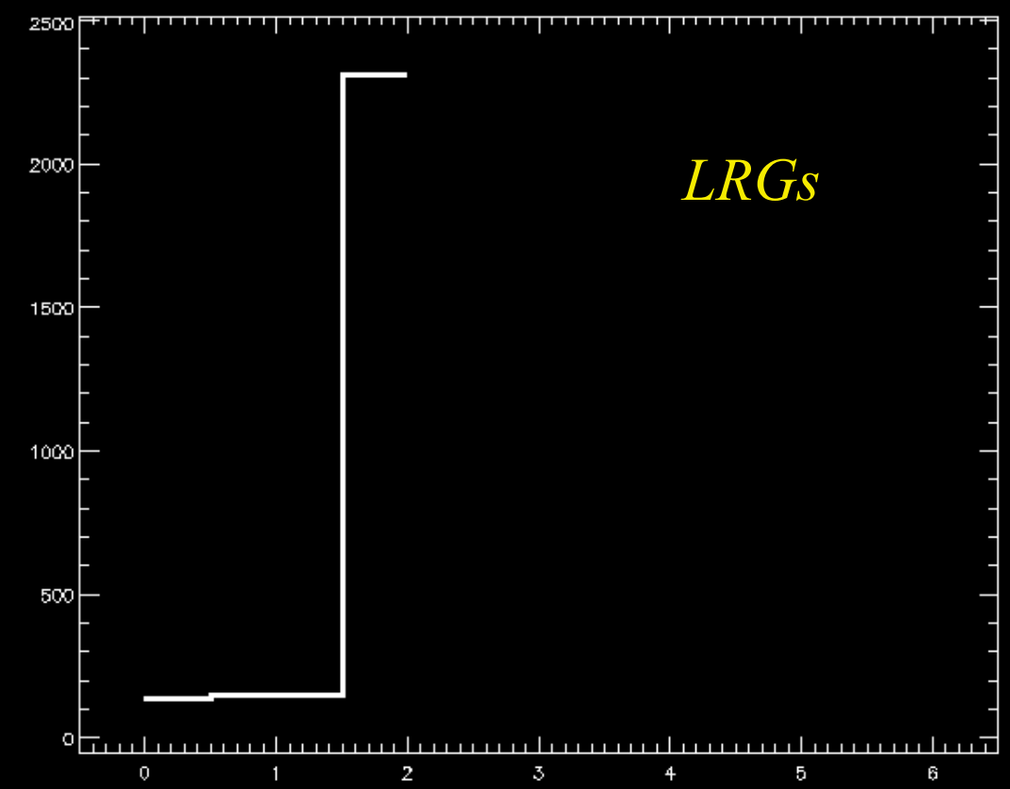
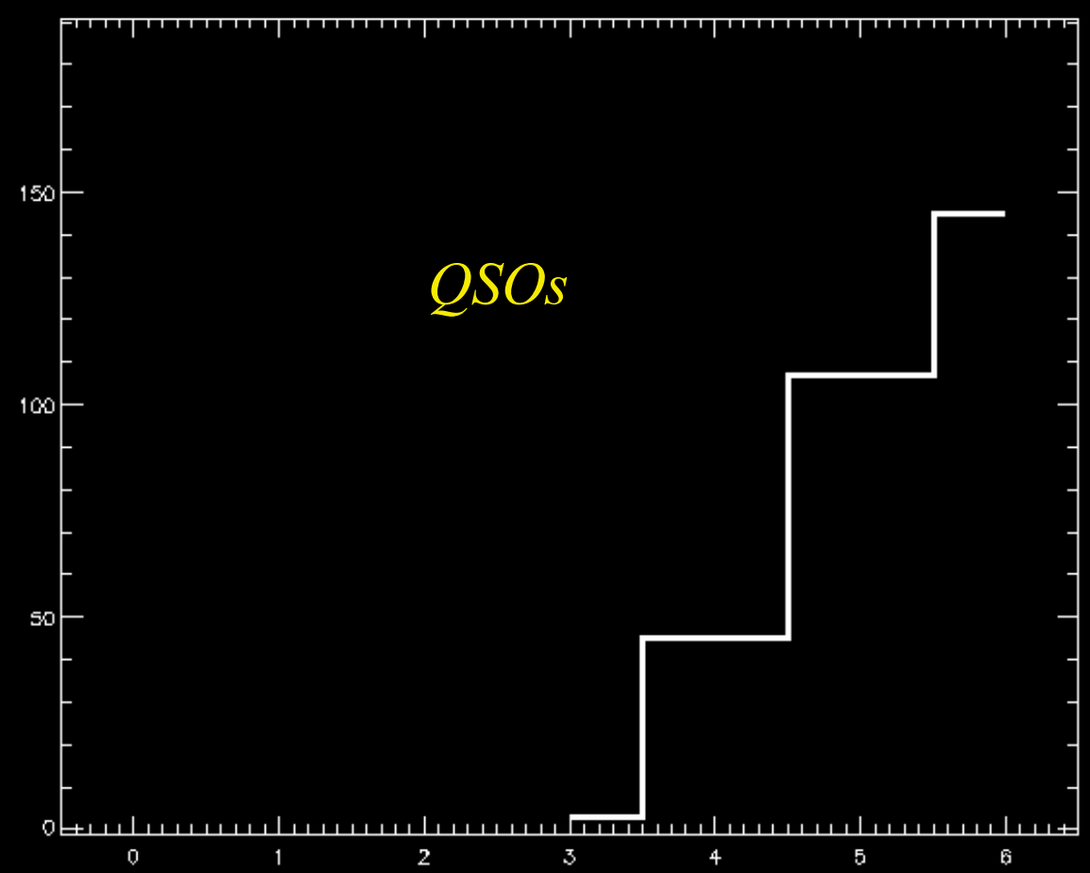
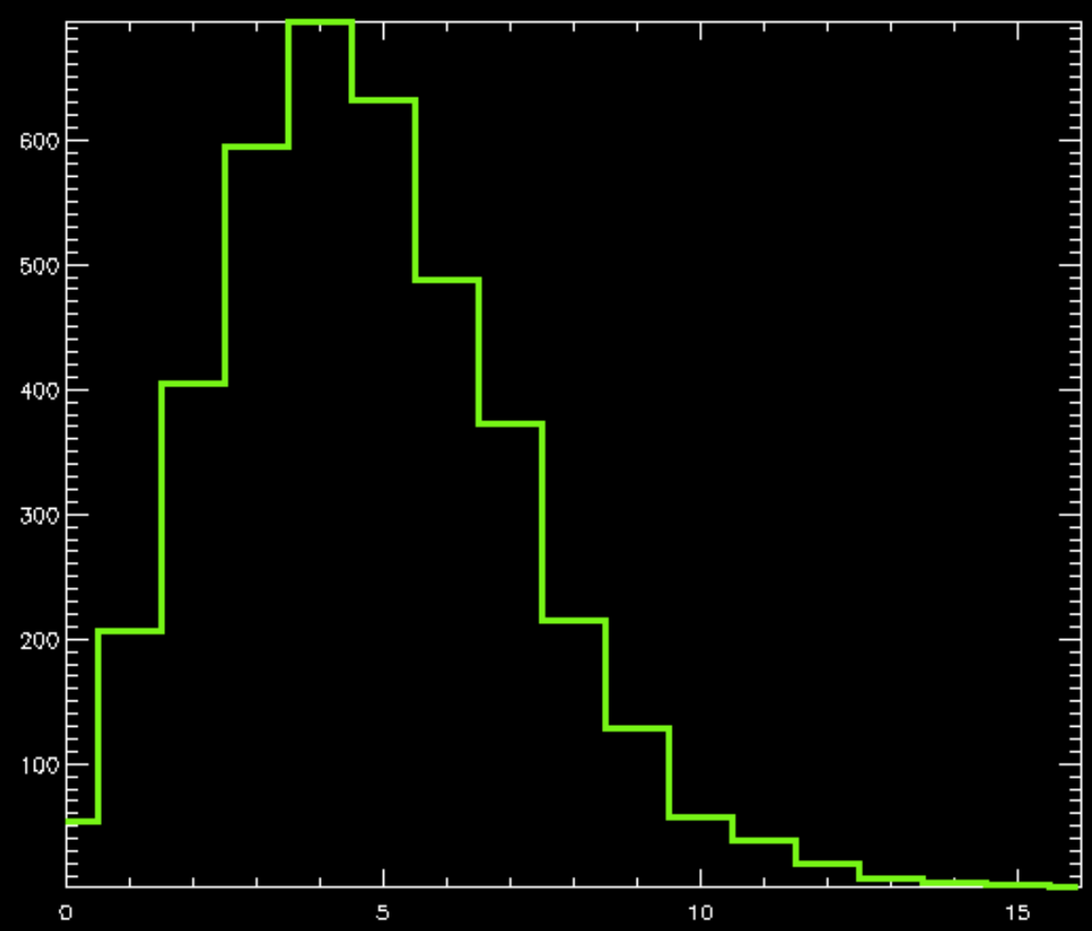




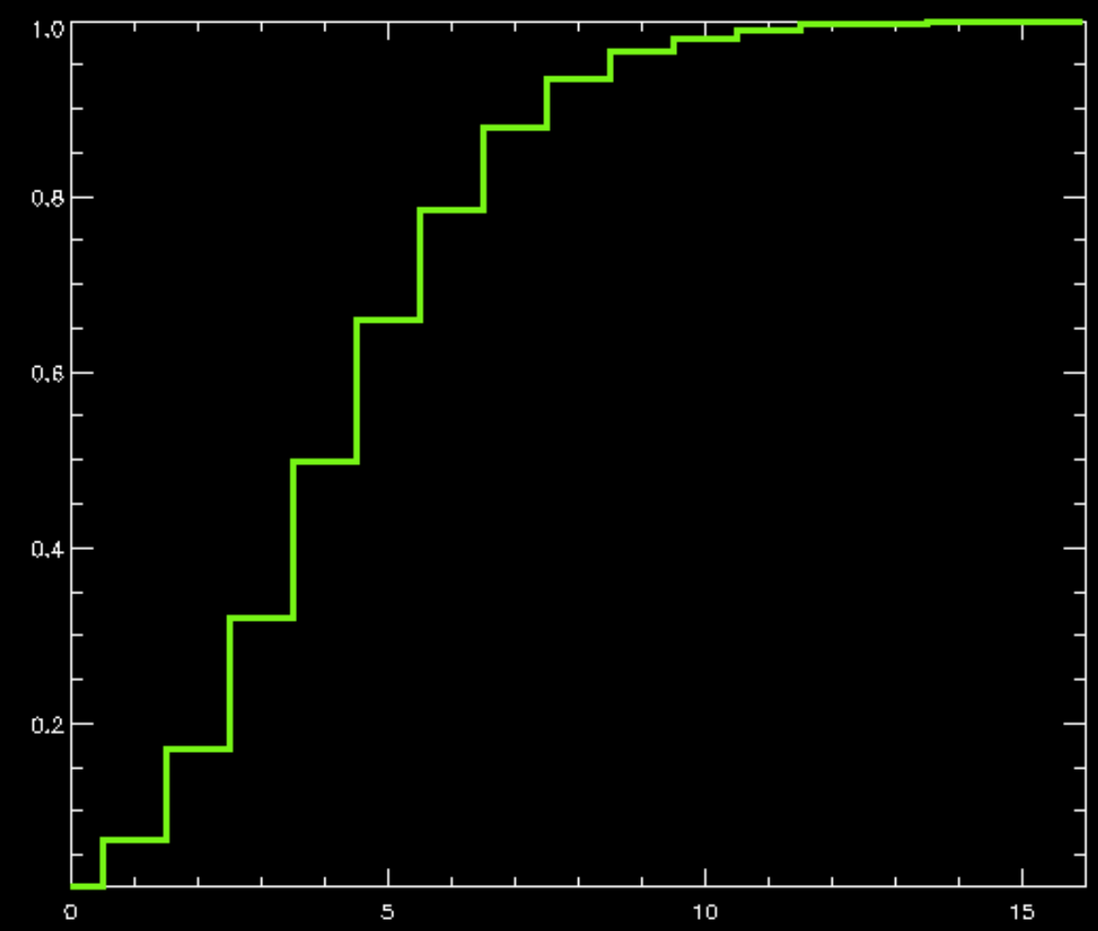


Multi-covering strategy

# of targets in patrol area of each fiber



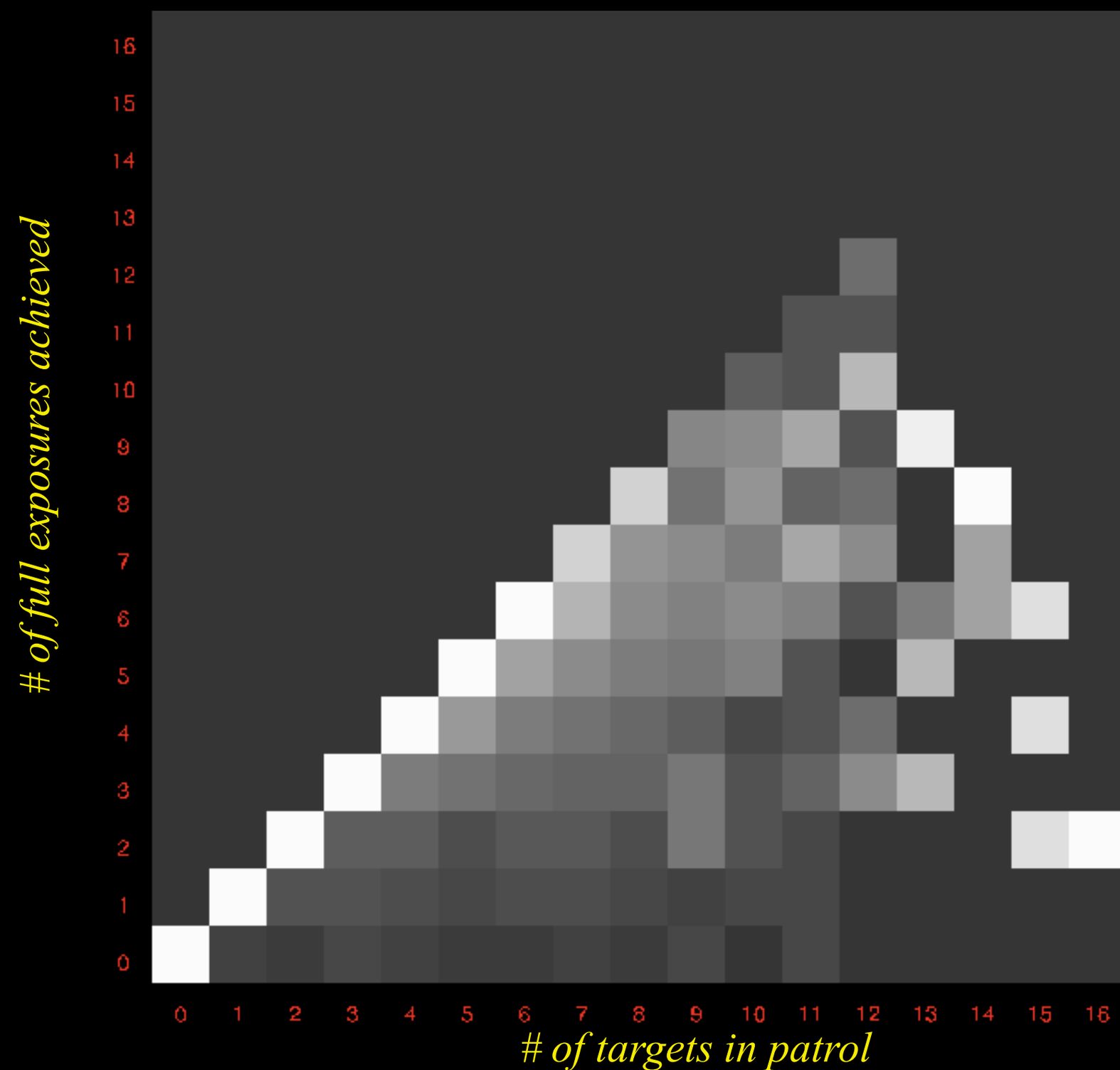
cumulative fraction



In our geometry, cannot get > 90% completeness

Multi-covering strategy

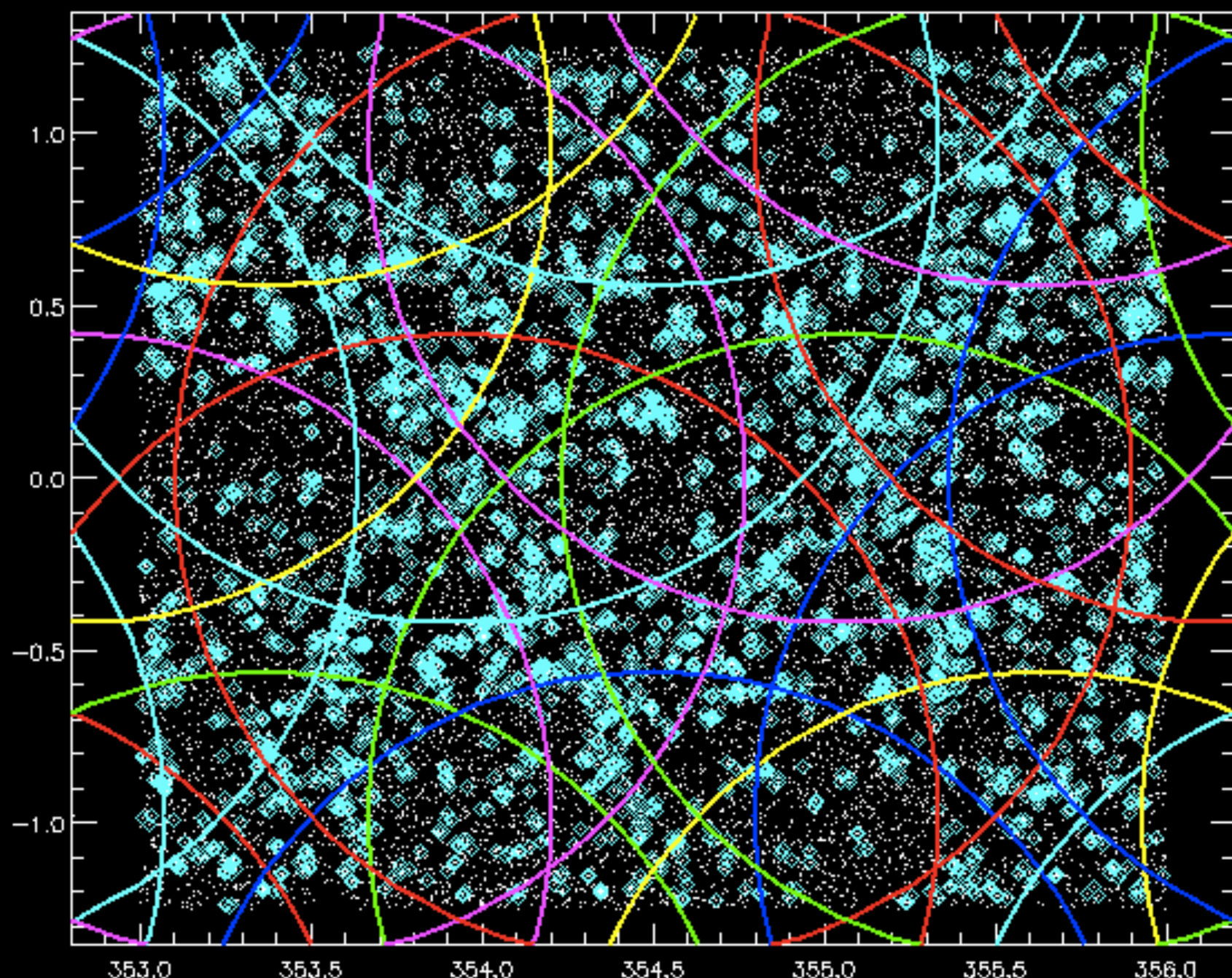
completeness is a function of local density (of course!)



Multi-covering strategy

fibers about 77% utilized, leaving some room for multiple exposures of ELGs, but we don't have full control over which

should I worry if the probability of catching an extra target in the patrol radius is correlated with the [OII] fluxes of its neighbors?



Multi-covering strategy

Obviously has to be rethought with real #s. I only just got access to the numbers discussed yesterday so haven't run them; the smaller patrol radii may help.

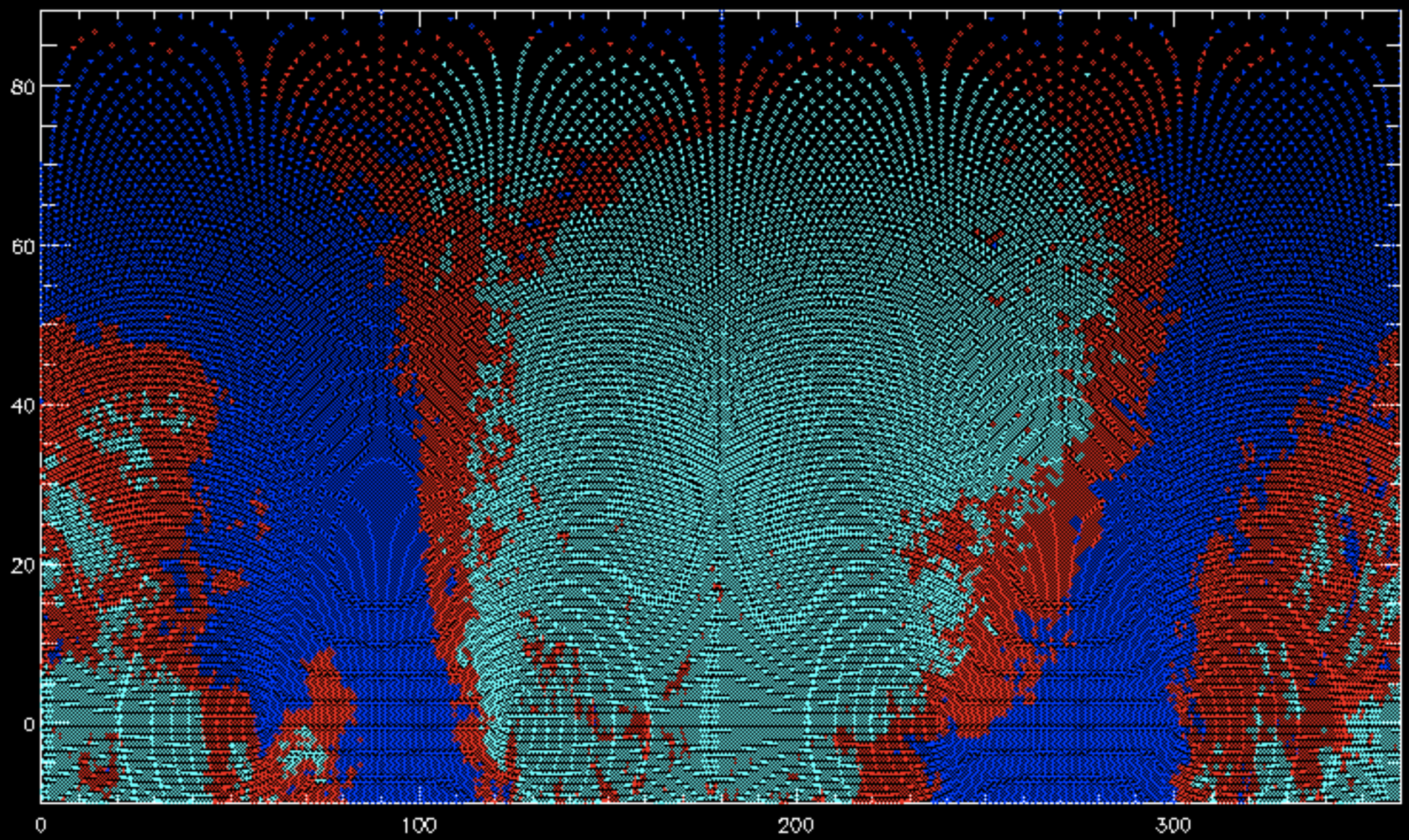
Key issue #1:
- even if rare, multiply observed objects (e.g. QSOs) require densely packed tiles
- that drives the available number density and/or exposure time of other targets
- e.g. we have 4000 fibers/ 0.83 sq deg, or need 5000 target-exposures/ sq deg
- room for target categories for which inhomogeneity doesn't matter?

Key issue #2:
- crowded patrol areas in the default configurations so far discussed
- the extra exposures available don't help much because patrol area is fixed-ish
- waiting for a QSO to finish can hold up all ELGs within 75 arcsec radius
- we need to know impact of density-dependent completeness

What does the survey look like?

E(B-V) < 0.05 *0.05 < E(B-V) < 0.20* *E(B-V) > 0.20*

about 10,000 sq deg at < 0.05



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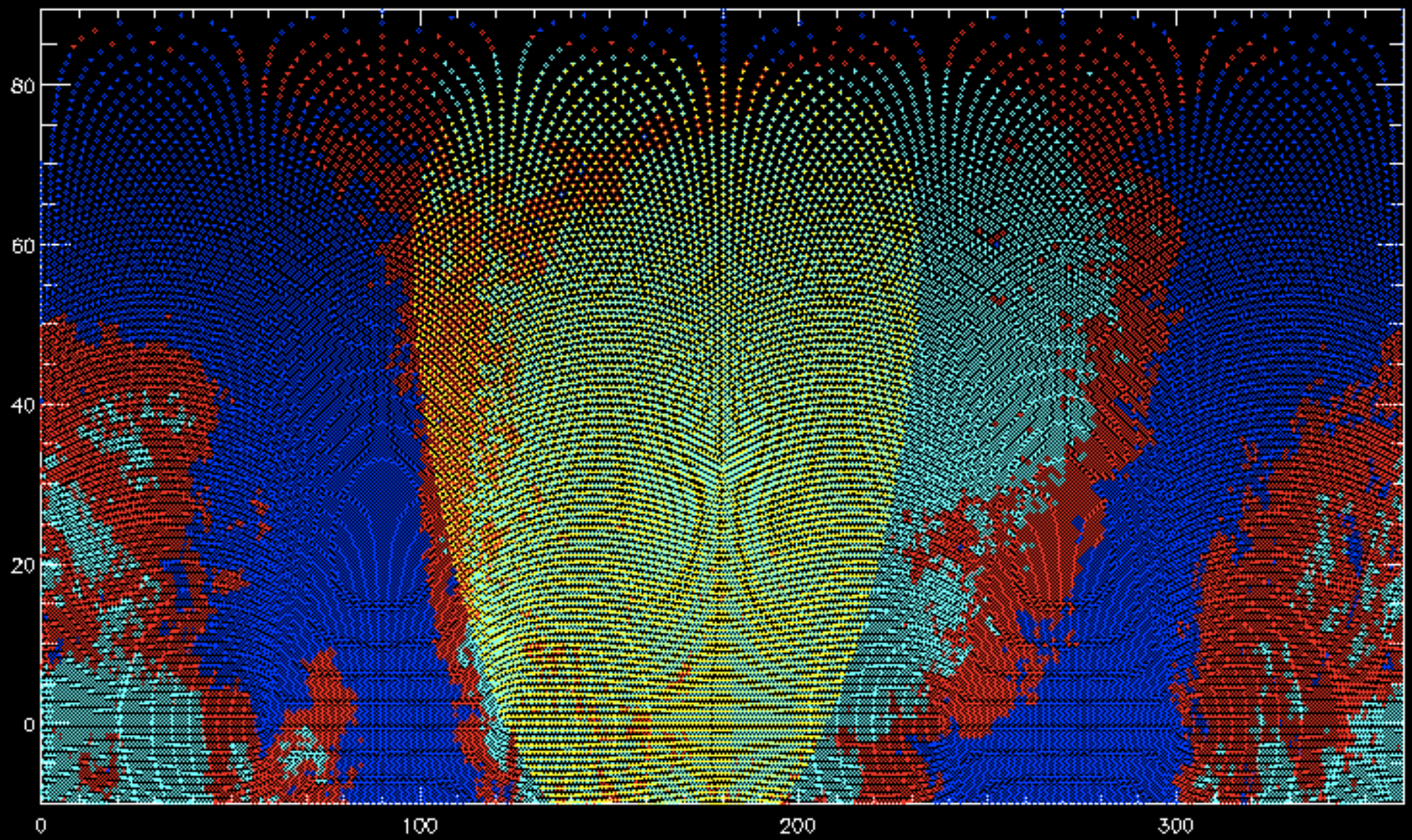
E(B-V) < 0.05 *0.05 < E(B-V) < 0.20* *E(B-V) > 0.20*

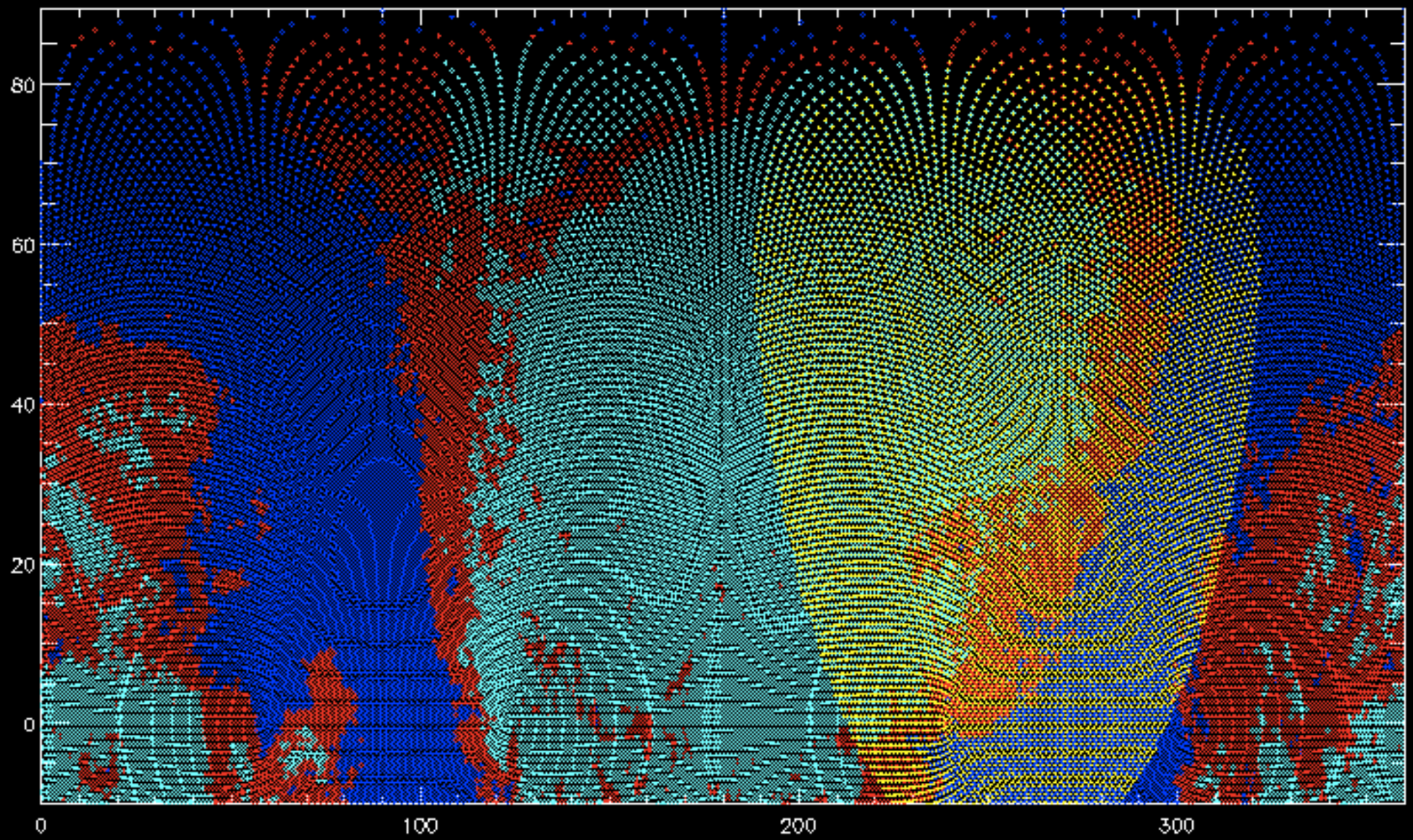
about 10,000 sq deg at < 0.05 *Observability @ midnight in March*



What does the survey look like?

E(B-V) < 0.05 *0.05 < E(B-V) < 0.20* *E(B-V) > 0.20*

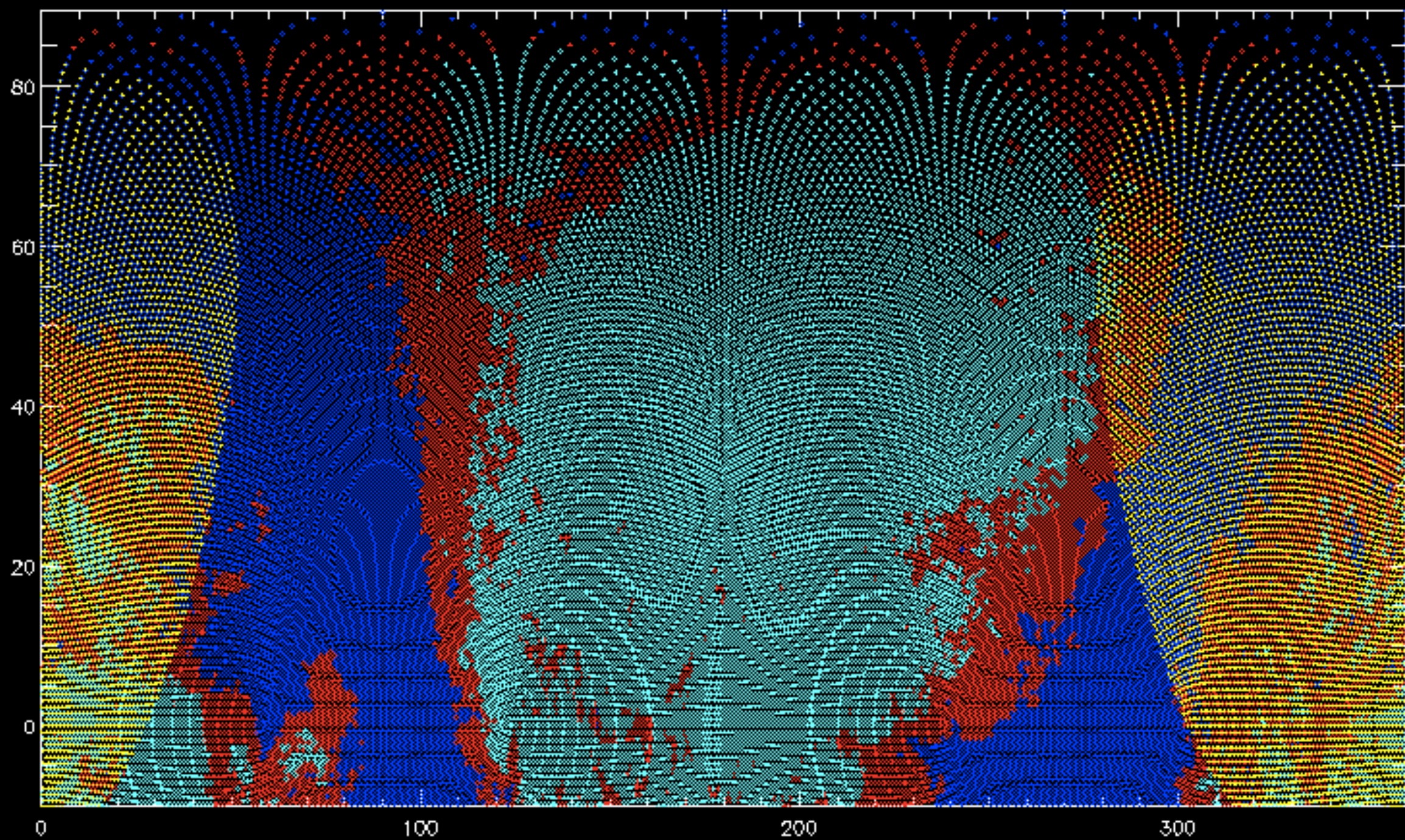
about 10,000 sq deg at < 0.05 *Observability @ midnight in June*



What does the survey look like?

E(B-V) < 0.05 *0.05 < E(B-V) < 0.20* *E(B-V) > 0.20*

about 10,000 sq deg at < 0.05 *Observability @ midnight in Sept.*



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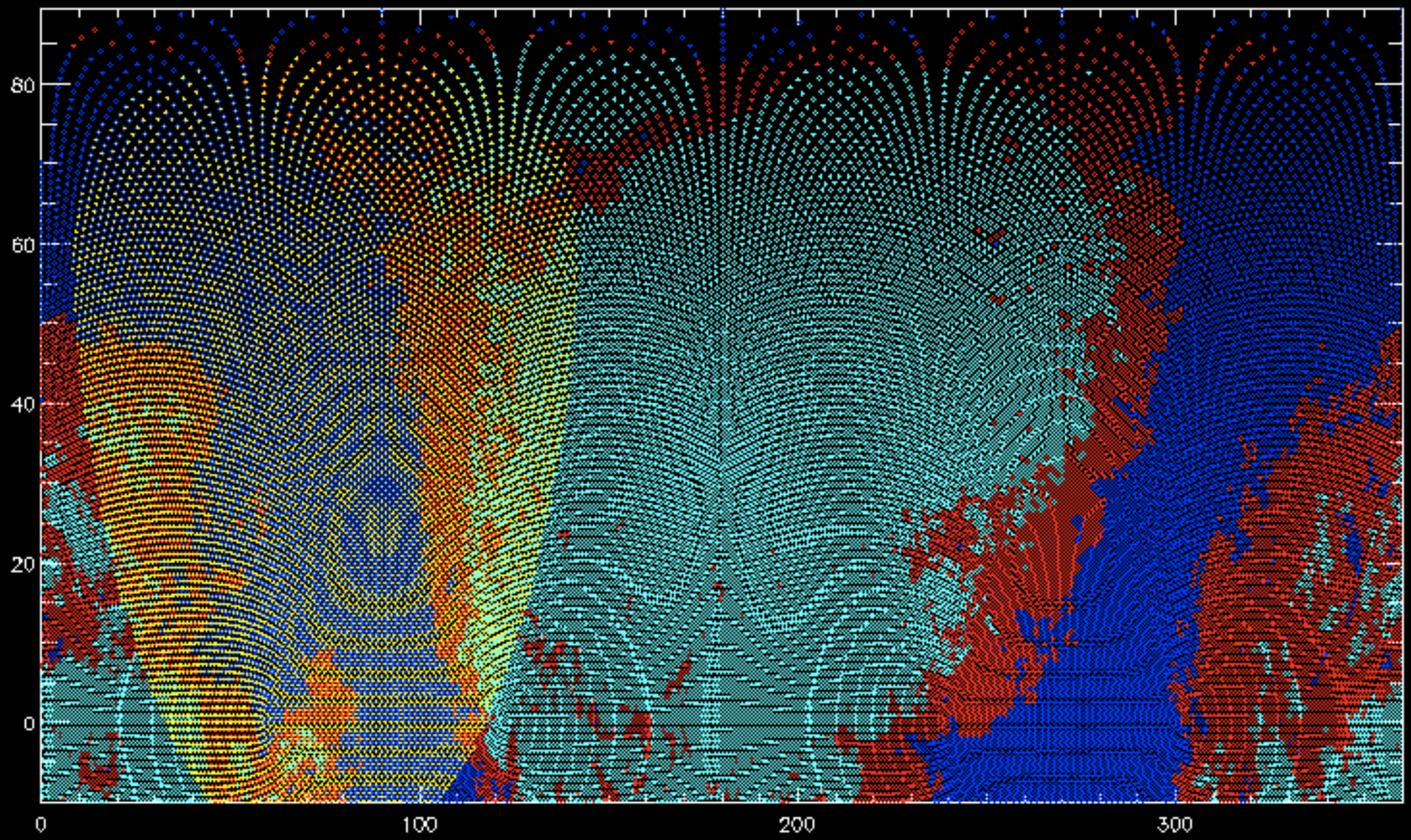
E(B-V) < 0.05 *0.05 < E(B-V) < 0.20* *E(B-V) > 0.20*

about 10,000 sq deg at < 0.05 *Observability @ midnight in Dec*



So ... is there an opportunity for deeper fields in the late Fall? targeted fields?