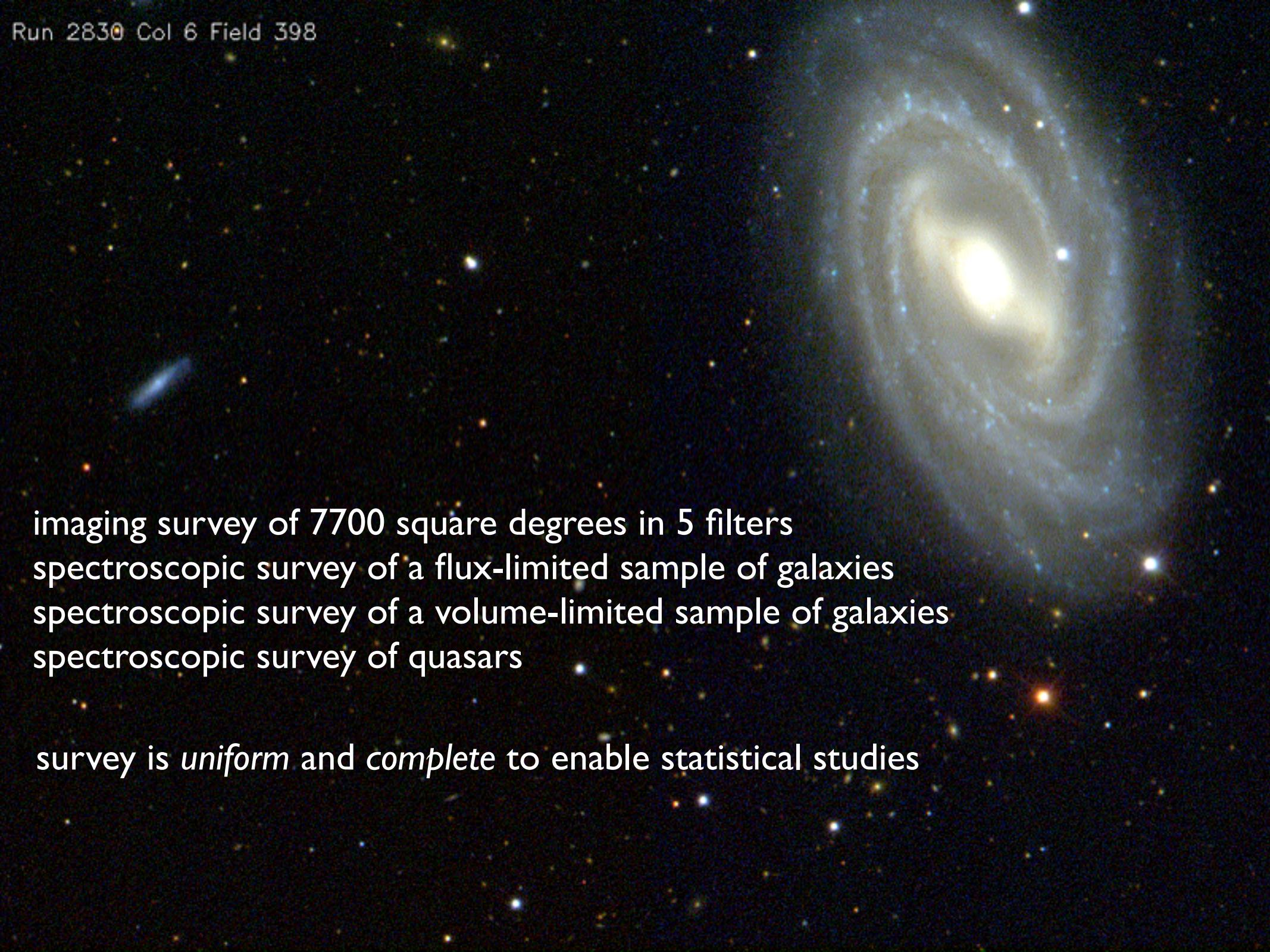


Sloan Digital Sky Survey

Richard Kron

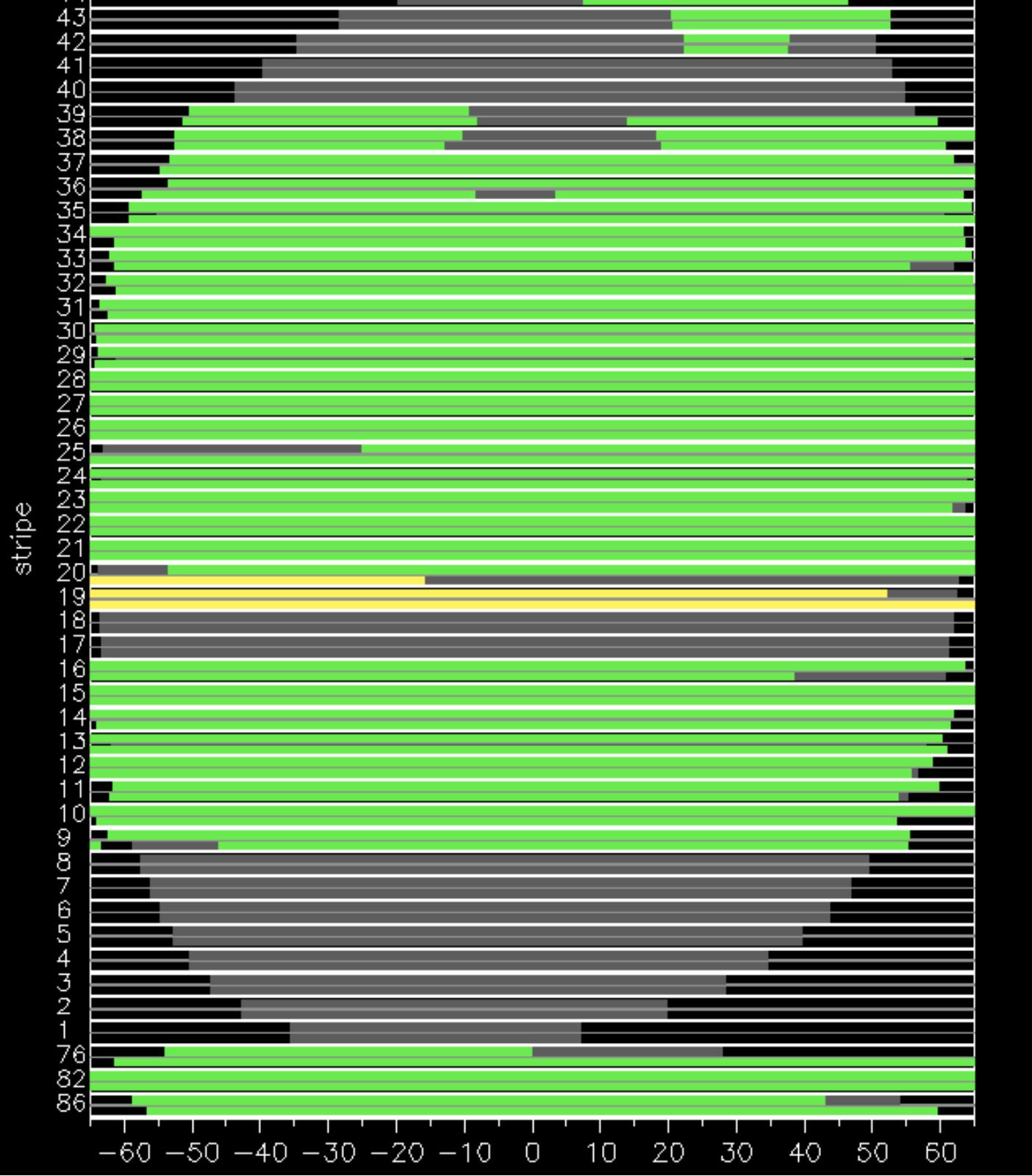
Fermi National Accelerator Laboratory and The University of Chicago

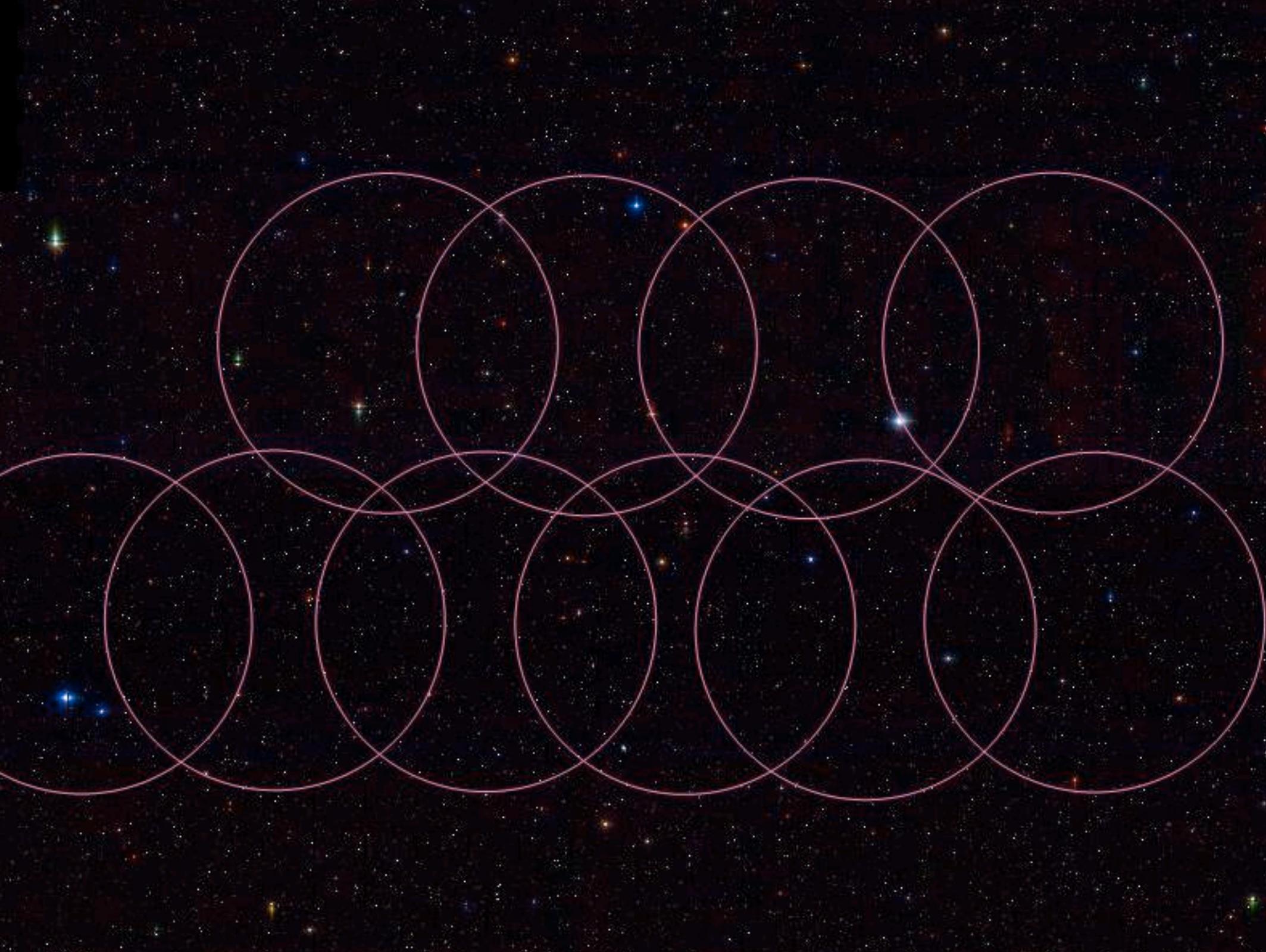


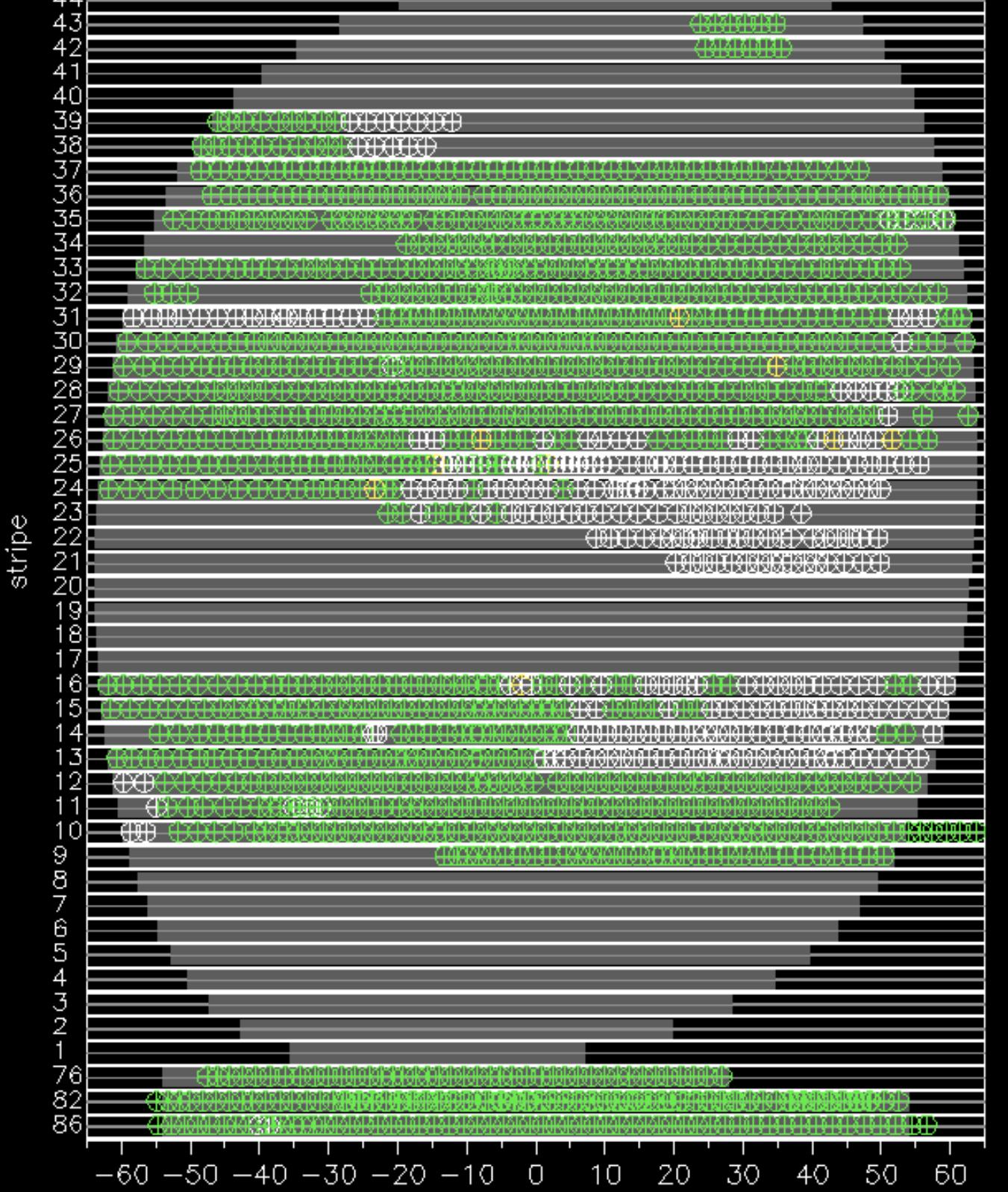


imaging survey of 7700 square degrees in 5 filters
spectroscopic survey of a flux-limited sample of galaxies
spectroscopic survey of a volume-limited sample of galaxies
spectroscopic survey of quasars

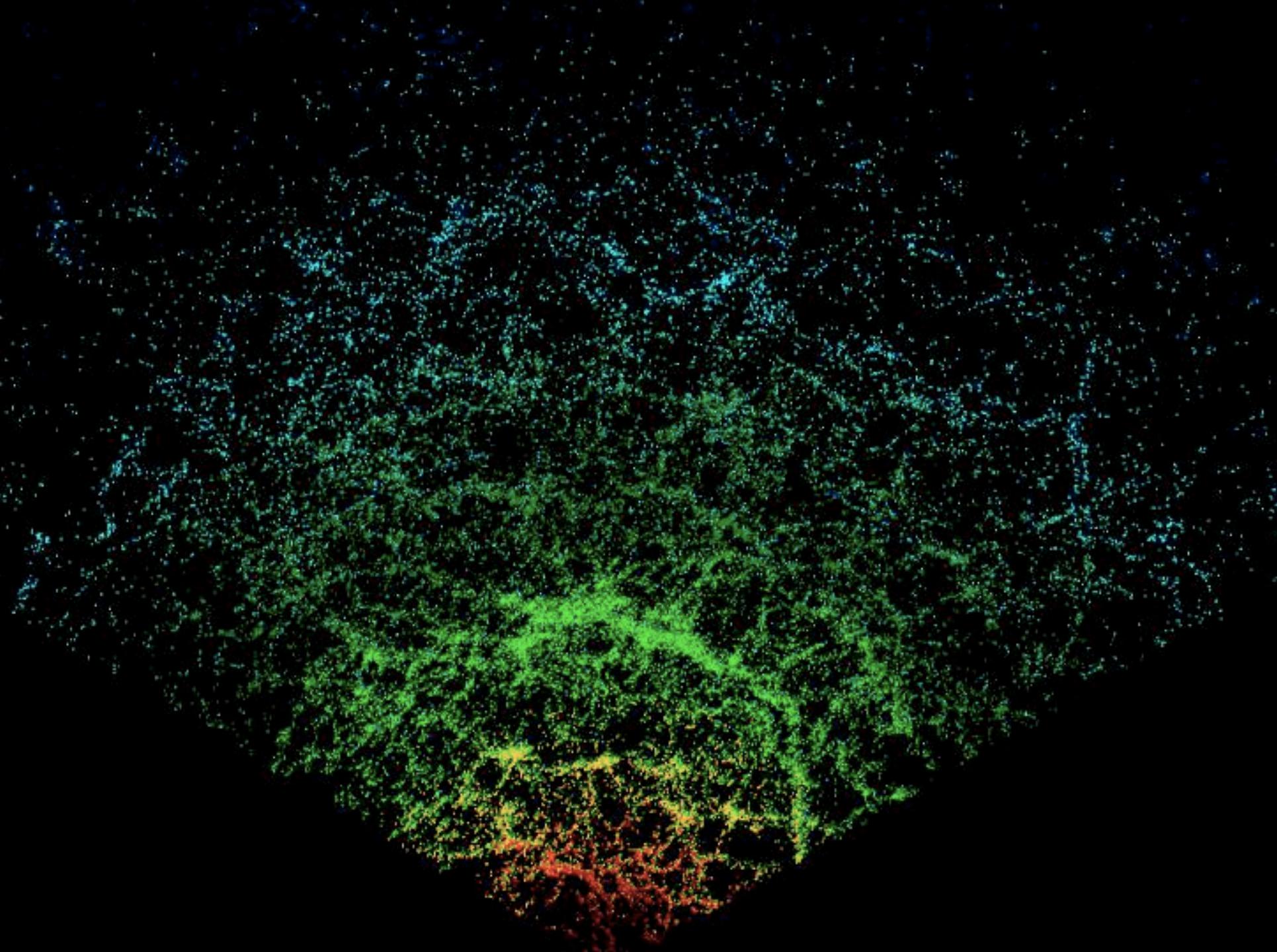
survey is *uniform* and *complete* to enable statistical studies







2.5-degree thick wedge of the redshift distribution of 205,000 galaxies

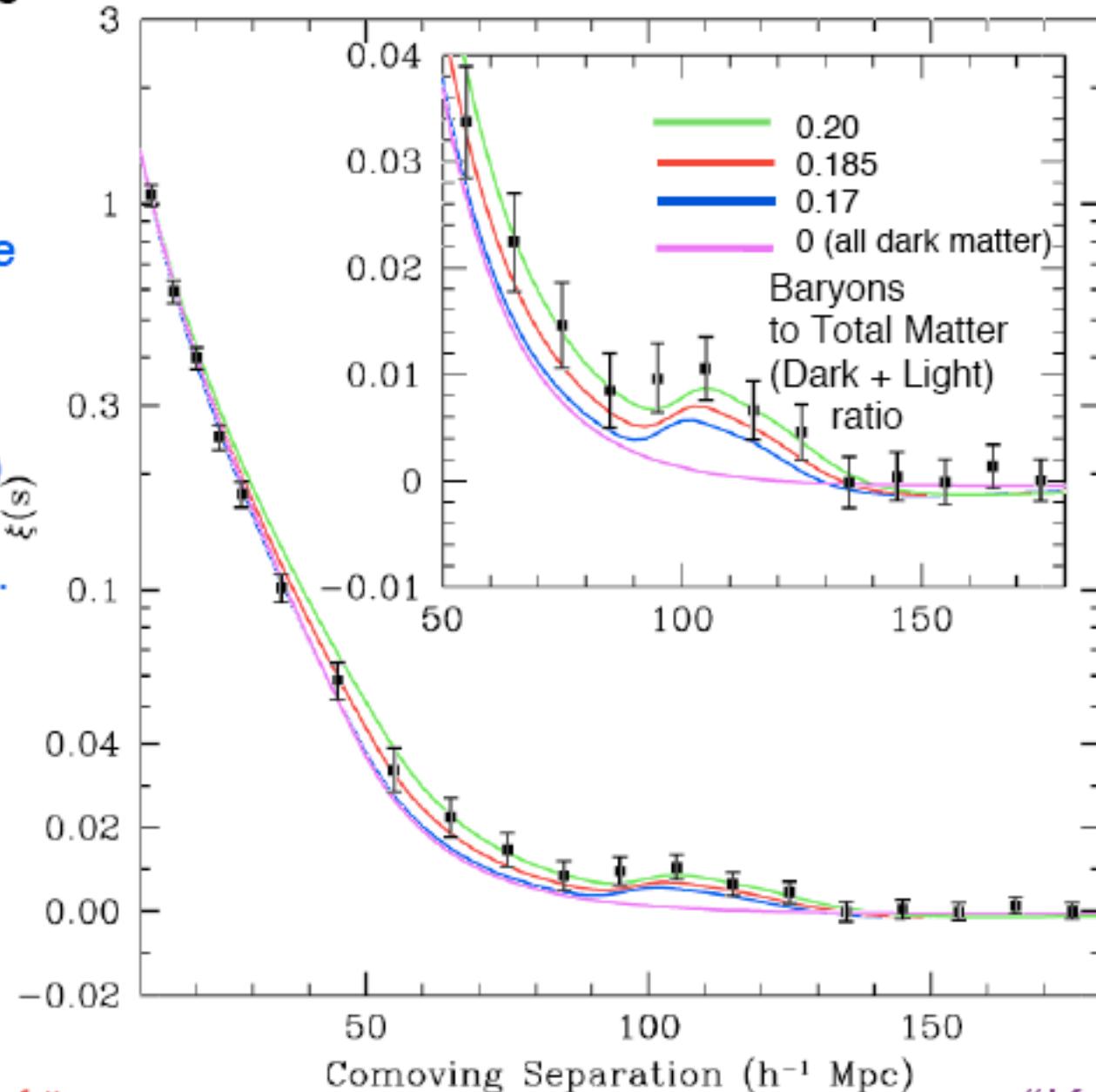


Detection of the 'Baryon Acoustic Peak' in the clustering of Galaxies on Large Scales with SDSS:

PHYSICS

Demonstrates:

1. There is some 'thing' which behaves like dark matter (not all baryons) at redshift 1000 ($\omega_s(s)$) (just like at $z=0$).



"Result of the week"

Eisenstein et al. 2005 ApJ in press

3. Ratio of these two 'types of matter', light and dark, is determined.

2. There are baryons which interact with photon plasma and evolve gravitationally.

4. Combined with CMB results:
Curvature ~ 0 , i.e. we live in a Euclidean 'Flat Universe'.

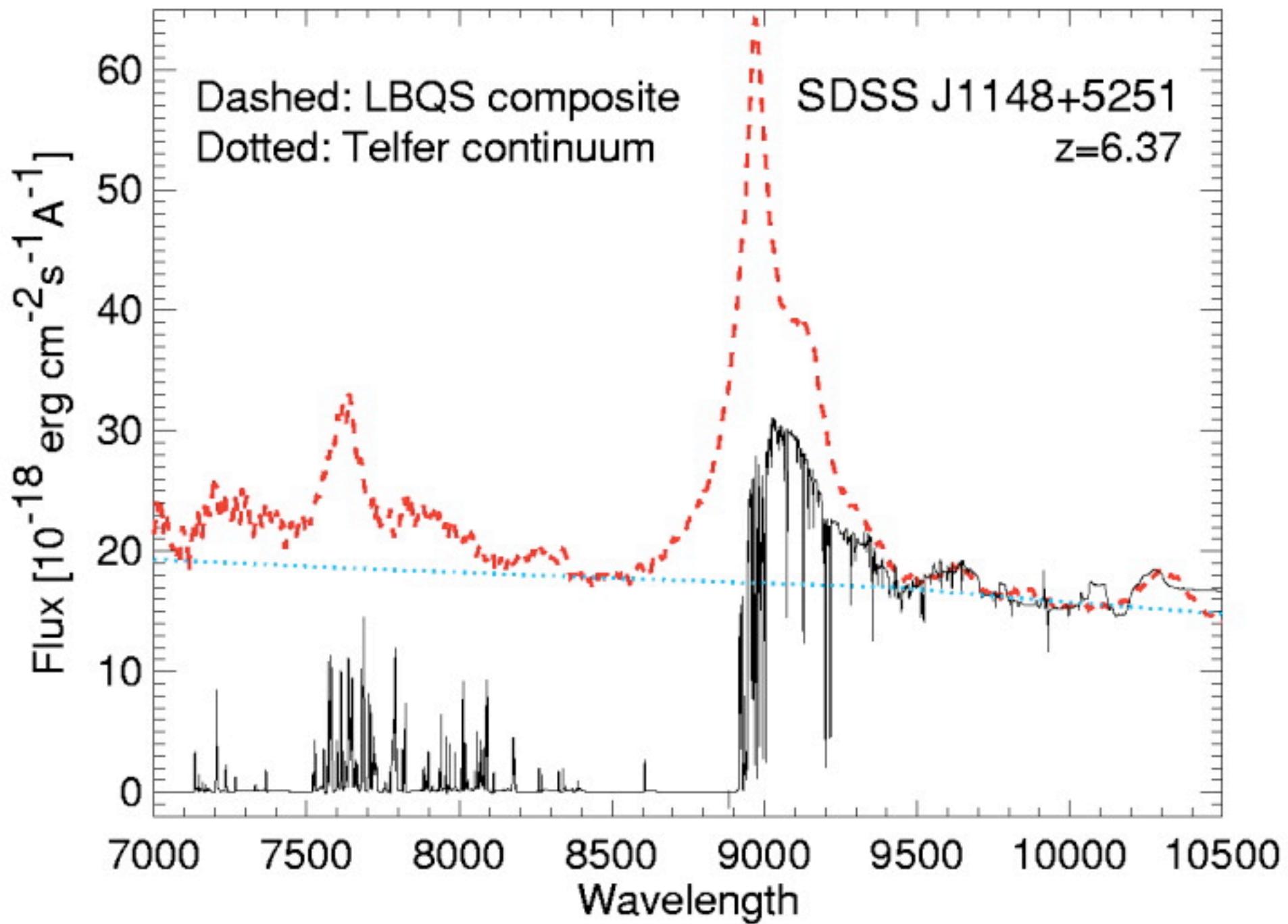
"Key Project" goal of SDSS

SDSS-II (2005-2008)

- **Legacy Survey**
 - Fill the gap in the North Galactic Cap: ~few hundred sq. deg. imaging and ~500 spectroscopic plates
 - Unique, high photometric precision, homogeneous legacy data set for future science
 - Filled volume to improve large-scale structure studies
- **SEGUE**
 - Imaging and spectroscopy into the Milky Way: 3500 sq. deg. imaging and 400 spectroscopic plates
 - Goals to study the structure and evolution of our galaxy and to probe the dark matter halo of the Milky Way
- **Supernova Survey**
 - 200 Type Ia supernovae with high-quality light curves, in the redshift gap $z=0.05-0.35$, to probe dark energy

Same as Fig. 2, but for SDSS J1148+5251. The hydrogen emission lines are much weaker than those in the template. Our best redshift determination for this object, $z = 6.37$, comes from matching the features redward of 9500 Å with the template.

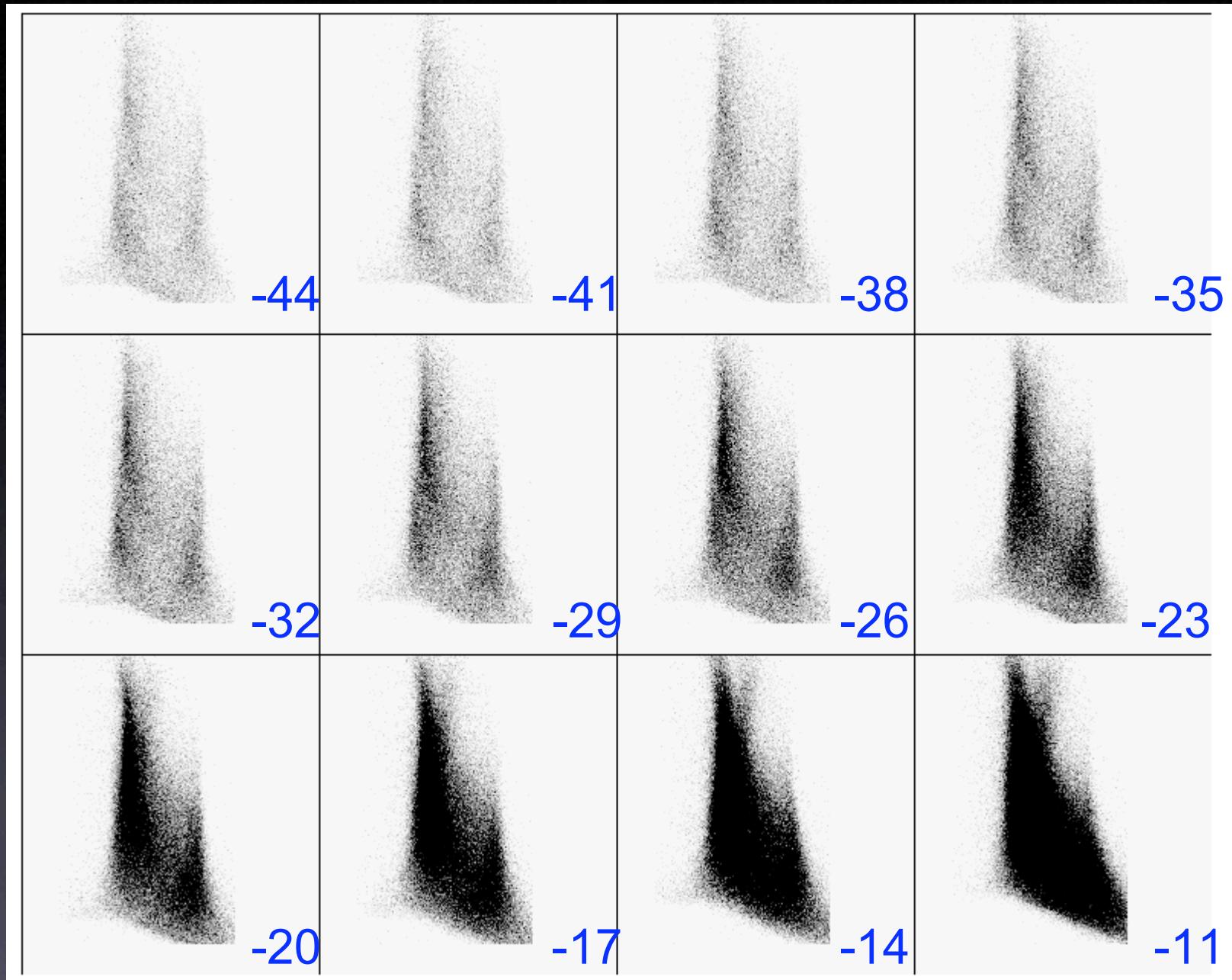
White et al. 2003 AJ 126, 1



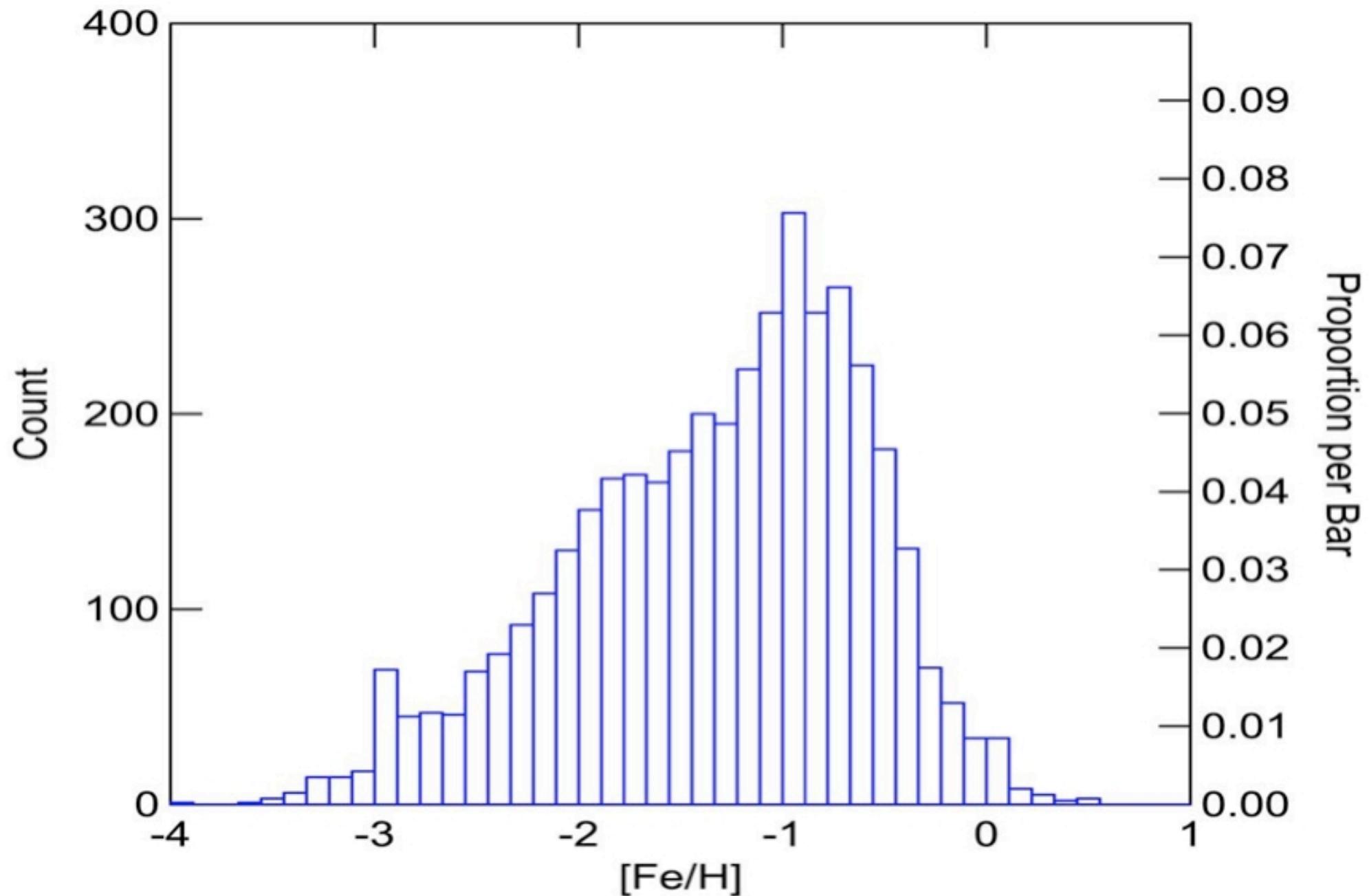
Oguri et al. 2004 ApJ 605, 78

B
A
C
D

30''



Strip 1100S ($i=50$ deg) CMDs (g-r,g)



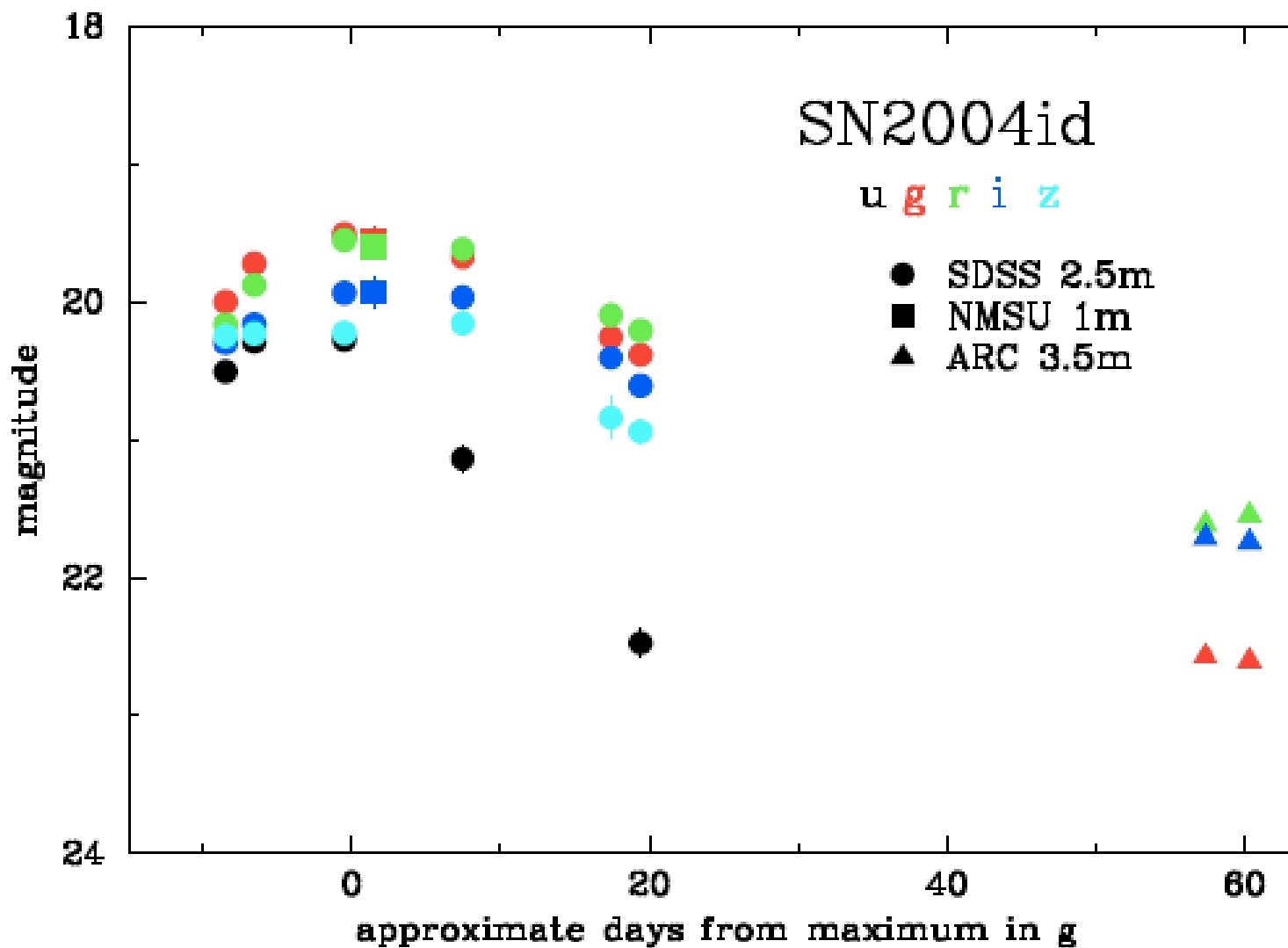
The SDSS COADD: repeated scans of the same piece of sky summed.



One Scan



Nine Scans summed

Figure 7: Same as in Figure 4 for the type Ia SN2004id + galaxy ($z = 0.1444$).

Participating Institutions

- The University of Chicago
- Johns Hopkins University
- New Mexico State University
- University of Pittsburgh
- Princeton University
- University of Washington
- Institute for Advanced Study
- Fermi National Accelerator Laboratory
- Los Alamos National Laboratory
- United States Naval Observatory
- Japanese Participation Group
- Max-Planck Institute for Astronomy (Heidelberg)
- Max-Planck Institute for Astrophysics (Garching)

New Partners

- Korean Scientist Group
- University of Portsmouth
- Ohio State University
- Cambridge University
- American Museum of Natural History
- Joint Institute for Nuclear Astrophysics
- Kavli Institute for Particle Astrophysics and Cosmology