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A Sensitive X-ray Survey of the Rubin/LSST Deep-Drilling Fields

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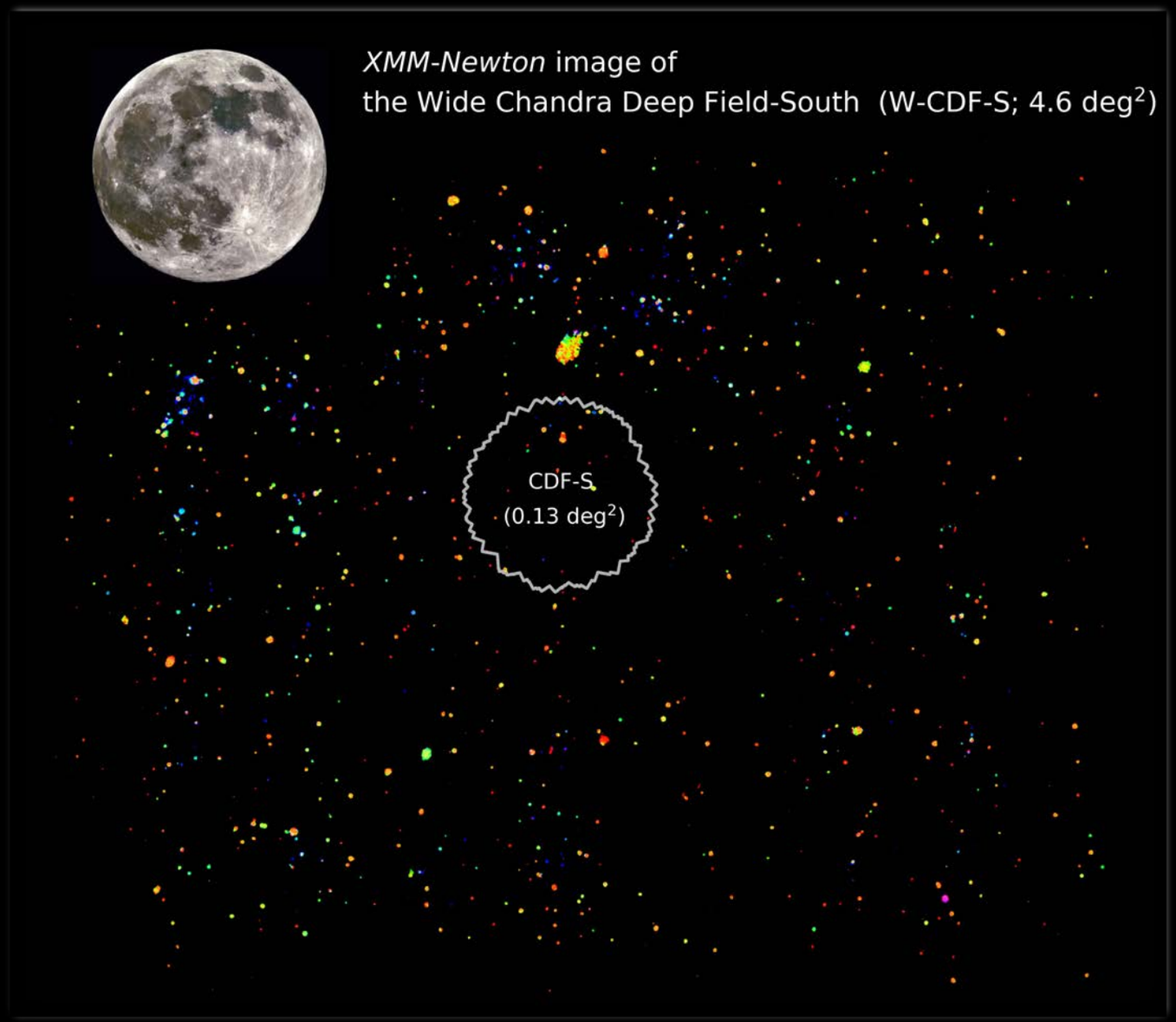
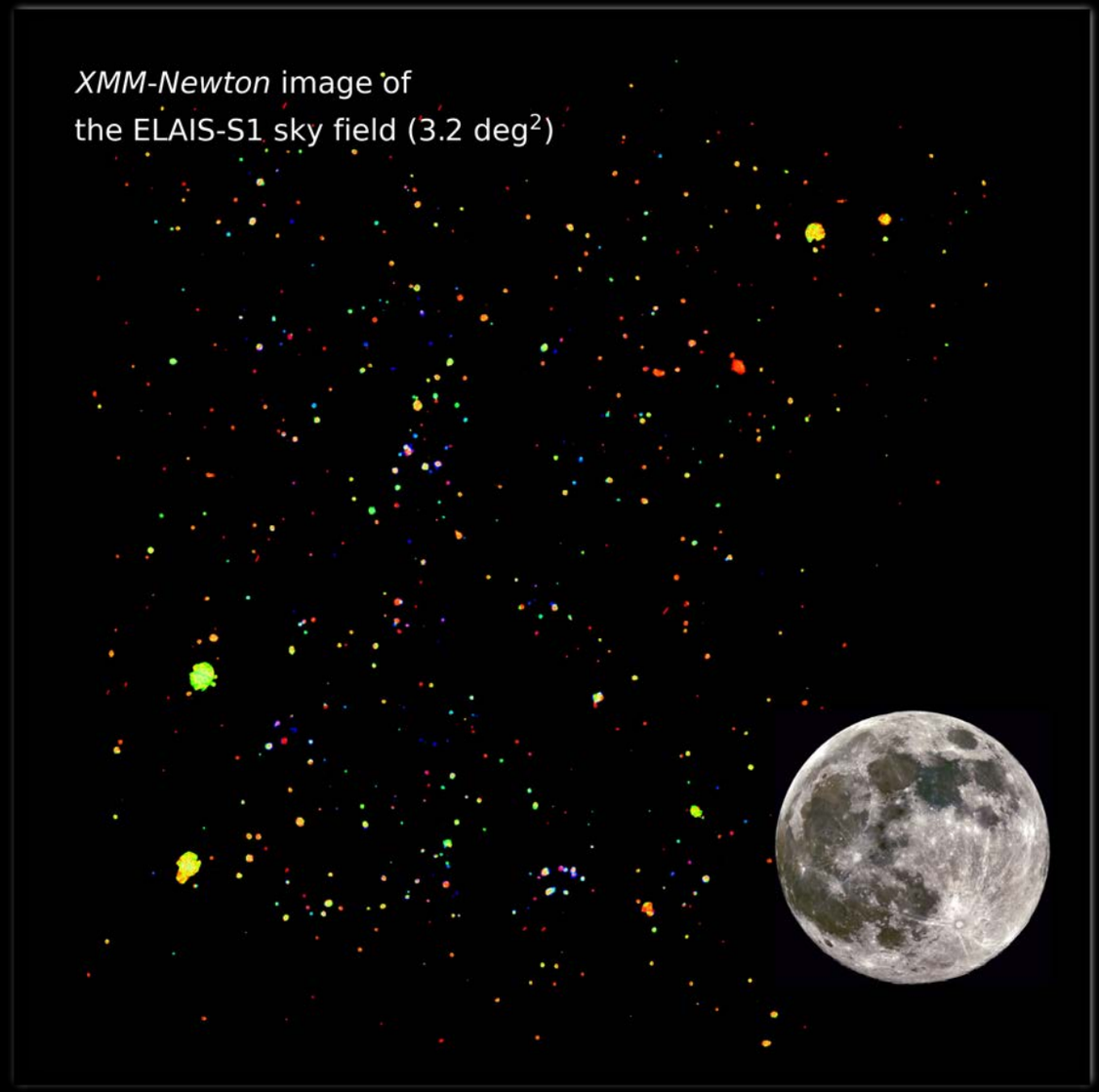
for the XMM-SERVS Collaboration





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Filling the gap between deep pencil-beam X-ray surveys and shallow wide X-ray surveys

Two popular types of X-ray surveys:

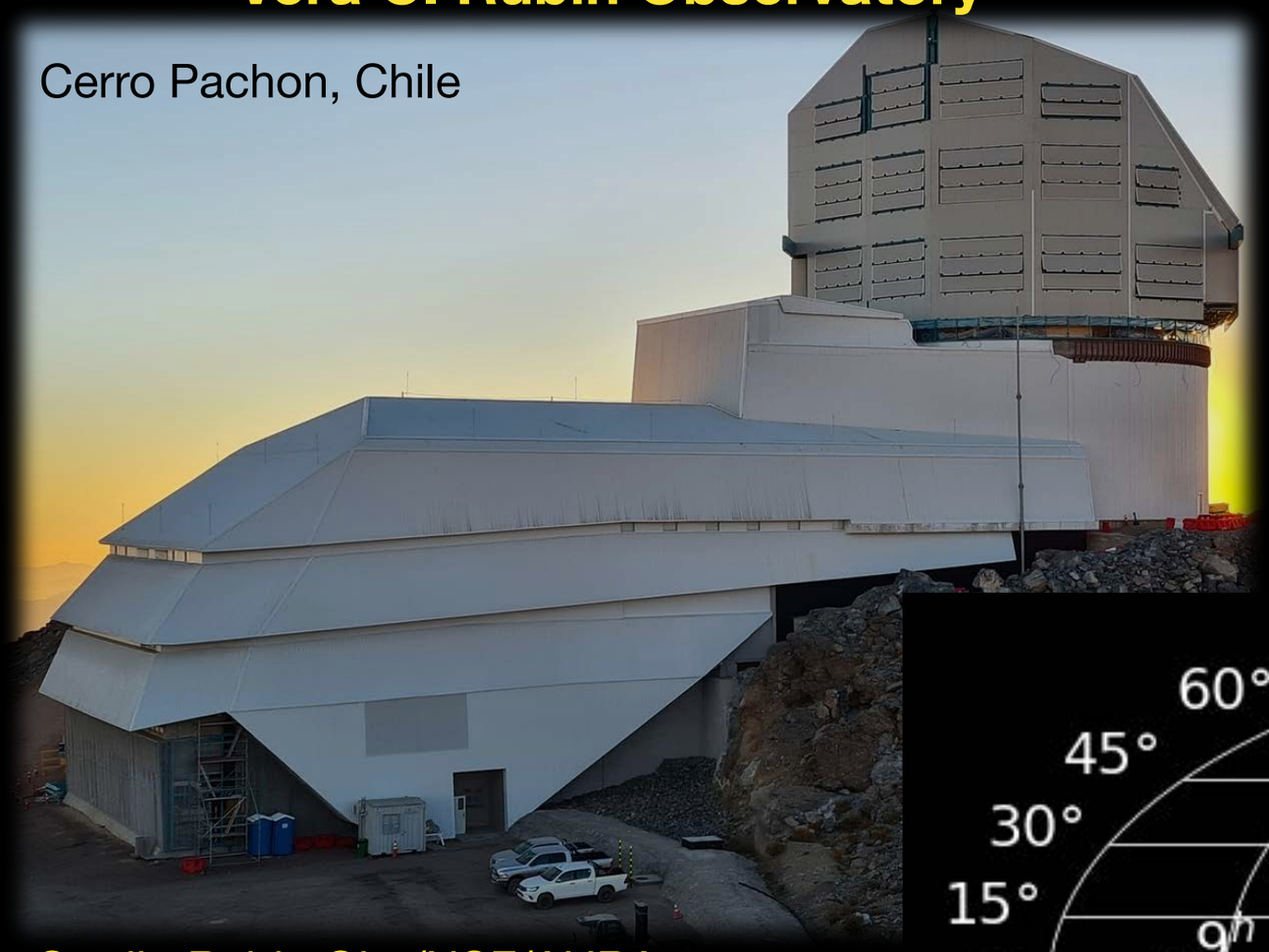
- Deep pencil-beam X-ray surveys (< 1 deg^2)
- Shallow X-ray surveys over large (at least tens or hundreds of deg^2) sky areas

XMM-SERVS

Deep X-ray surveys in three Spitzer Extragalactic Representative Volume Survey **(SERVS) fields with** *XMM-Newton*

Providing X-ray coverage for the Deep-Drilling Fields of the Legacy Survey of Space and Time (LSST)

Vera C. Rubin Observatory

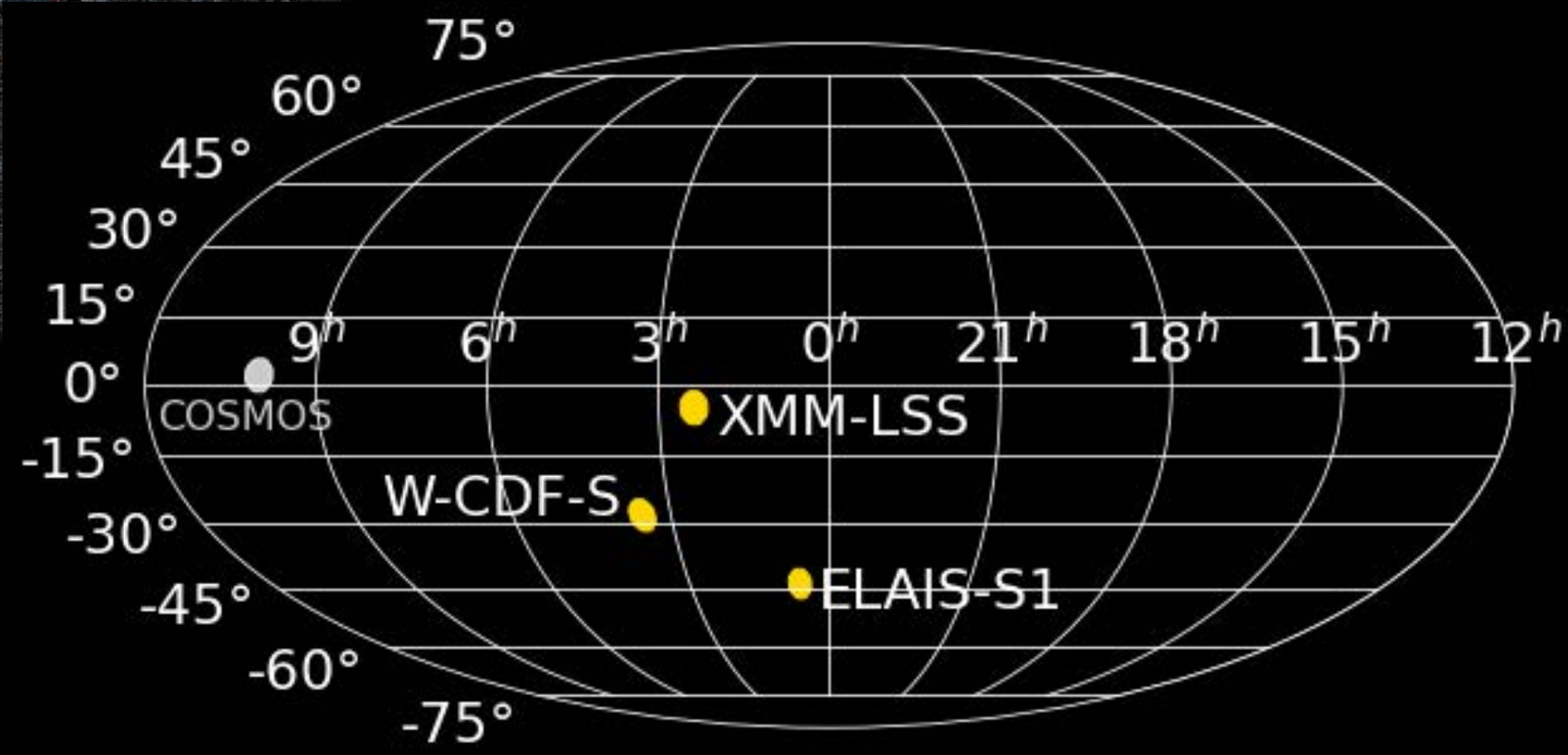


Credit: Rubin Obs/NSF/AURA

Operation starts in ~2023

LSST is a ten-year survey to be conducted by the Rubin Observatory that will cover all of the southern sky

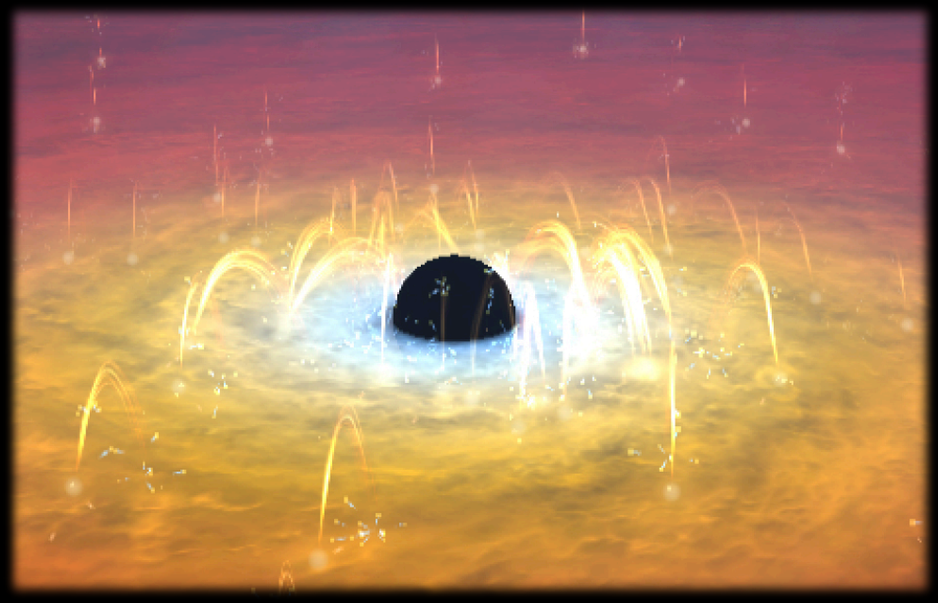
Deep-Drilling Fields: selected ~10 deg² fields where substantially more Rubin observations will be obtained



The XMM-SERVS survey provides ~12000 X-ray sources including growing black holes and clusters

XMM-Newton cutout in W-CDF-S (≈ 0.4 deg^2)

Active Galactic Nucleus (AGN): growing supermassive black hole

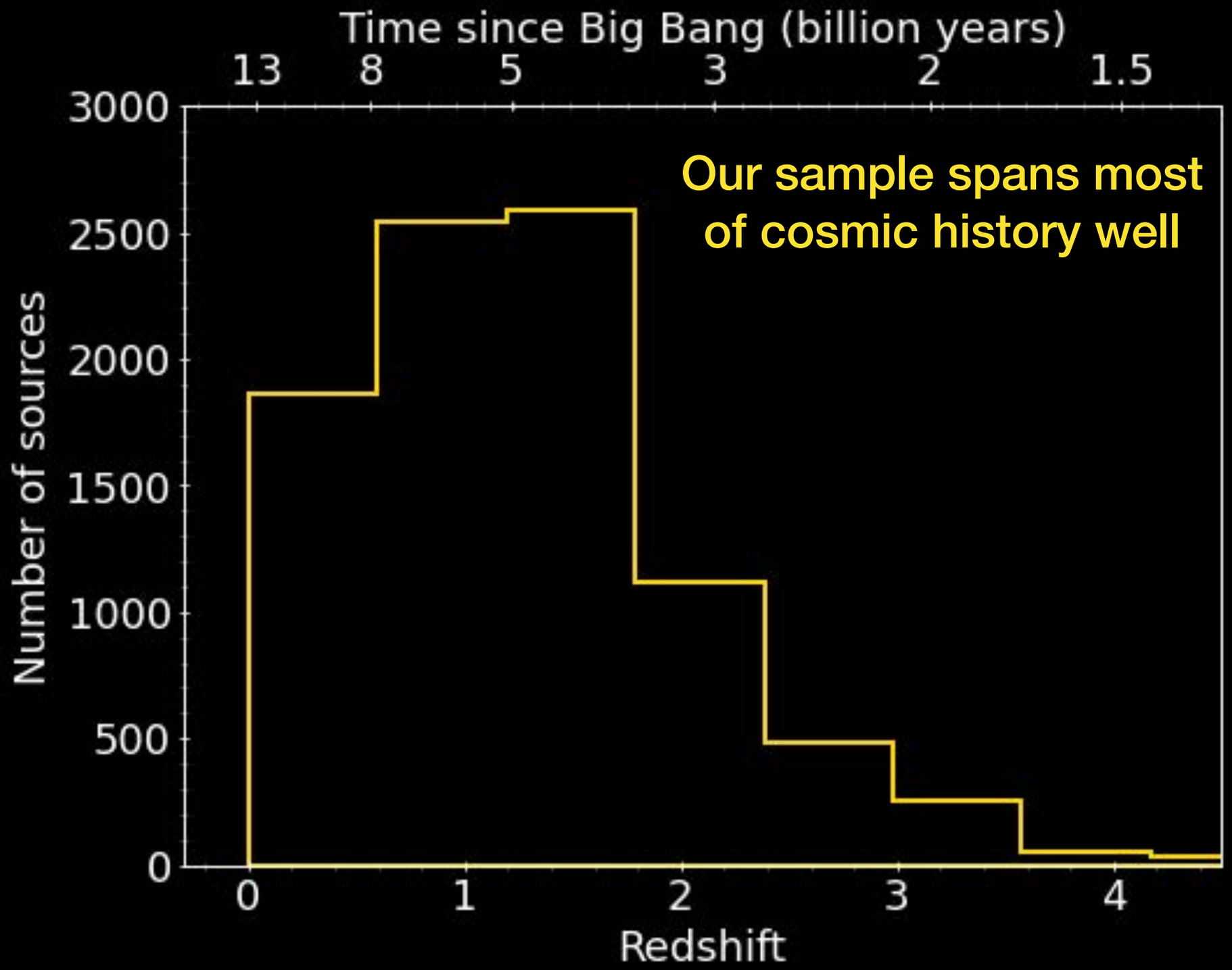


Population data about growing supermassive black holes to better understand their physical properties and evolution

X-ray cluster

Redshifts of the detected X-ray sources

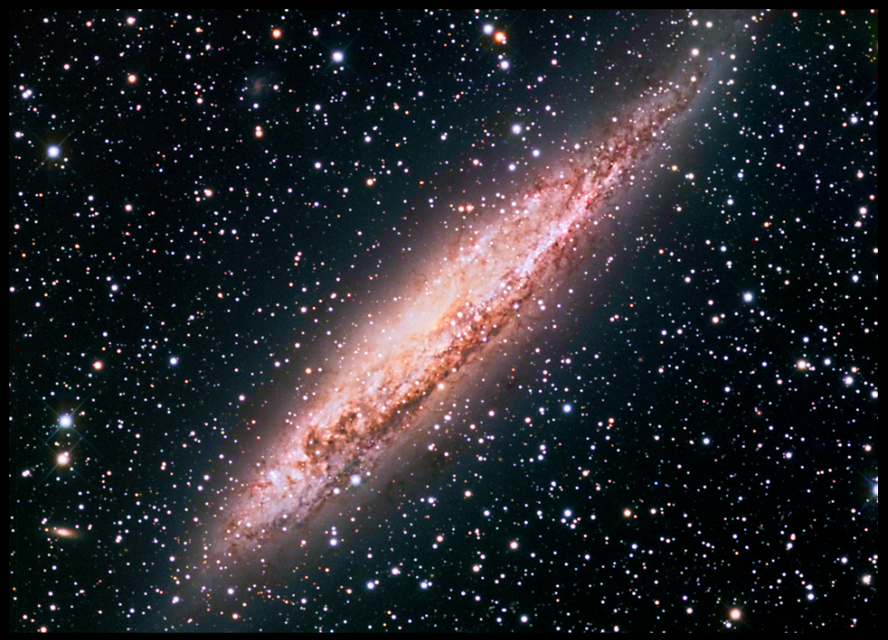
~90% of X-ray sources detected have counterparts at other wavelengths → **redshift**



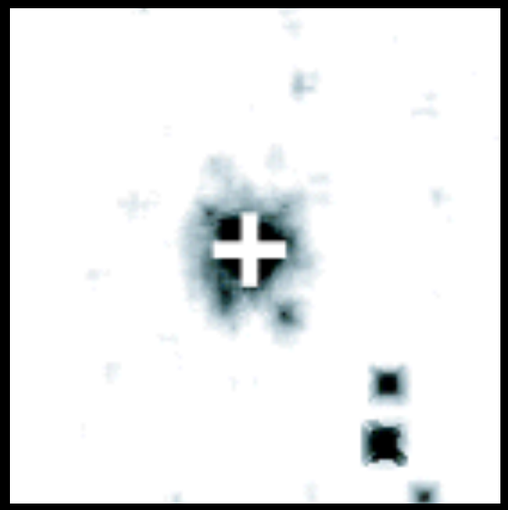
The great legacy value of the XMM-SERVS survey in the next decade

Helping AGN selection in LSST

Obscured AGN in the optical



Obscured AGN in the X-ray

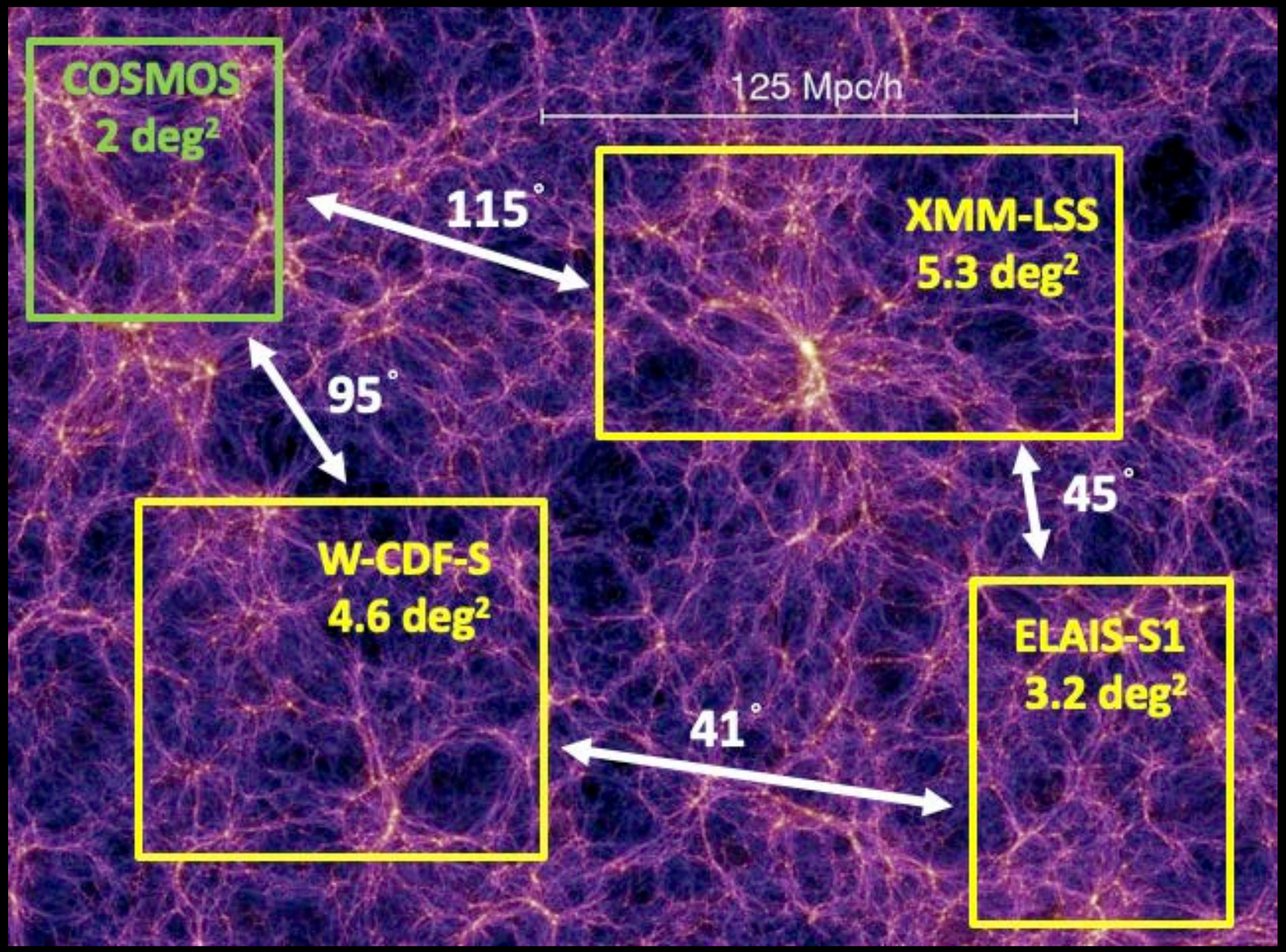


XMM-SERVS: providing a “ground truth” sample of AGNs

Helping LSST find tens of millions of AGNs across the southern sky!

The great legacy value of the XMM-SERVS survey in the next decade

Studying supermassive black-hole growth across the full range of cosmic environments



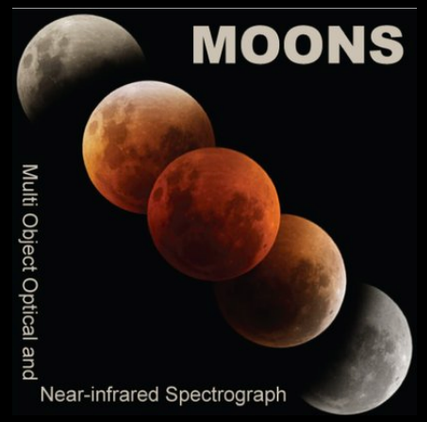
Density field at z = 1.4. Credit: the Millennium Simulation Project

The great legacy value of the XMM-SERVS survey in the next decade

Powerful new spectroscopic surveys

SDSS-V

Prime Focus Spectrograph
SuMIRe



4MOST

Radio

Submillimeter

TolTEC
ASU Cardiff INAOE Michigan NIST Northwestern UMass Wisconsin

Infrared

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Thanks!

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