

The Whole is Greater than the Sum of the Parts: Optimizing the Joint Science Return from LSST, Euclid and WFIRST

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The scientific opportunity offered by the combination of data from LSST, WFIRST and Euclid goes well beyond the science enabled by any one of the data sets alone. The range in wavelength, angular resolution and redshift coverage that these missions jointly span is remarkable. With major investments in LSST and WFIRST, and partnership with ESA in Euclid, the US has an outstanding scientific opportunity to carry out a combined analysis of these data sets. It is imperative for us to seize it and, together with our European colleagues, prepare for the defining cosmological pursuit of the 21st century.

Jain et al. White Paper, Feb. 2015, Conclusions

The main argument for conducting a single, high-quality reference co-analysis exercise and carefully documenting the results is the complexity and subtlety of systematics that define this co-analysis. Falling back on many small efforts by different teams in selected fields and for narrow goals will be inefficient, leading to significant duplication of effort.

However the full benefits of jointly analyzing any two of the surveys can be reaped only through pixel-level analysis.

The resources required to achieve this additional science are outside of what is currently budgeted for LSST by NSF and DOE, and for WFIRST (or Euclid) by NASA. Funding for this science would most naturally emerge from coordination among all agencies involved, and would be closely orchestrated scientifically and programmatically to optimize science returns. A possible model would be to identify members of the science teams of each project who would work together on the joint analysis. The analysis team would ideally be coupled with an experienced science center acting as a focal point for the implementation, and simultaneously preparing the public release and documentation for broadest access by the community.

➡ Is this workshop the first meeting of a joint team?

Why a meeting now? What has changed?

- LSST is still as exciting.
- WFIRST officially entered Phase A and became “a NASA project” on Feb. 16.
 - ➔ Several WFIRST Science Investigation Teams (SIT) have been selected and are collectively defining the instruments and the scientific surveys.
- Now is a good time to rethink the synergies identified in the Jain et al. paper and discuss their implementation.
- The driving questions for this meeting are thus:
 - ➔ How can we maximize the joint scientific return of LSST and WFIRST?
 - ➔ How can we maximize WFIRST scientific return in the era of LSST?
 - ➔ How close/coupled can the data processing pipeline be?
 - ➔ How can we enable joint processing in the future data centers?
 - ➔ How can we make sure we reap the expected benefits in photo-z?
 - ➔ What is the best joint SNe programs?
 - ➔ Can we jointly generate the N-body simulations we need?
 - ➔ ...