Key papers within the GQC Working Group

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Key papers

1. A data release paper for the Survey Validation data assembly.
2. A data release paper for the Year 1 data assembly DA1, including the co-release of DA0.5.
3. Large-Scale Structure catalog, including two-point clustering, from DA0.5 and DA1.
4. Measurement of the BAO from the galaxy/quasar two-point clustering, including reconstruction, from DA0.5 and DA1.
5. Measurement of full-shape cosmology (RSD, AP, neutrino mass, fNL) from the galaxy/quasar two-point clustering, from DA0.5 and DA1.
6. Measurement of the BAO from the Lyman-α forest auto-correlation and the forest-quasar cross-correlation, using two-point clustering, from DA0.5 and DA1.
7. Cosmological model inference from the two-point clustering, from DA0.5 and DA1.

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Key projects rules

- All GQC key projects will **only be publish with Y1 data** "and the collaboration is embargoed from publishing earlier versions with SV or DA0.5."

- "It is not necessary that all Standard Projects use blinded analysis or the KP blinding plan, but they need to not prematurely unblind the Key Project result while pursuing their non-KP analysis."

- **The unblinded cosmological results will appear in the key papers, while supporting papers will only contain blinded results.**

- Supporting papers can be published earlier than key papers, but they need to respect the blinding plan and particularly the unblinding date.

- "And in many cases, the Key Paper is strengthened by the consideration of multiple branches of underlying methodology, which can then be compared and contrasted. Hence, we want to encourage multiple methods to be considered in the Key Projects, potentially yielding multiple supporting papers in a given topic."

- "Unblinded clustering and its cosmological interpretations are part of the Key Papers and **are protected**, while supporting paper topics are not protected except of the documentation of target selection, survey design, etc."
- Re-analysis of protected analysis: Any alternative analysis which uses protected topics (e.g. cosmological inference) can be announced (to the collaboration) as a standard project after the key papers have been published.

Key project 3

Key Paper 1: Alphabetical ELG, LRG and QSO catalogue paper (No cosmological measurements). This paper will present the DESI Y1 ELG, LRG and QSO catalogues, including various statistical properties and tests. This work will include the catalog of all QSOs suitable for the Ly-α work.

- We expect to need 4 splits for each sample: NGC BASS/MzLS, NGC DECaLS, SGC not DES, SGC DES.
- We envisage a large table showing how the targets were classified after spectroscopy.
- Plots of the angular extent of the data and the n(z).
- Brief summary of target selection algorithms and redshifting.
- Any problems with the data and/or issues will be briefly discussed with mitigation techniques.
- Brief discussion of the method used to calculate 2-point statistics.
- The 2-point multipole-moment statistics ξ_ℓ and P_ℓ (large-scale only) will be presented.
- No cosmological inference will be made.

Key Paper 2: Alphabetical BGS catalogue paper (No cosmological measurements). This paper will present the DESI Y1 BGS catalogue, including various statistical properties and tests.

- Plots of the angular extent of the data and the n(z).

- Brief summary of target selection algorithms and redshifting.

- Any problems with the data and/or issues will be briefly discussed with mitigation techniques.

- Brief discussion of the method used to calculate 2-point statistics.

- The 2-point multipole-moment statistics ξ_ℓ and P_ℓ will be presented.

- No cosmological inference will be made.

Key project 3 - supporting papers

- **Angular systematics:** New methods of angular systematics correction.
- **Radial systematics:** e.g. fiber throughput, bad fibers, weather, astrometry and centroiding of targets etc.
- **QSO catalog systematics:** redshift estimates, QSO identification etc.
- **Fiber assignment:** PIP weights, impact on all samples (ELG, LRG, QSO, BGS)
- ELG HOD fits and sample description.
- LRG HOD fits and sample description.
- QSO HOD fits and sample description.
- BGS HOD fits and sample description.
- **Mock catalogs:** Method + comparison to data
- **Covariance matrix:** Methods, analytic comparison, smoothing, will discuss covariance for all samples (BGS, ELG, LRG, QSO).
- **Blinding method:** Method, mock tests

Key Paper: BAO measurement paper (unblinded).

- BAO measurements + statistical and systematic errors.
- Covering all low redshift samples: ELG, LRG, QSO and BGS.
- Plots of $P(k)$ and $\xi(s)$ for all samples against models.
- Comparison to previous measurements.
- Match between measurements and Planck LCDM.

- **BAO fitting method:** No unblinded cosmological measurements + mock challenge results, comparison of different methods.
- **Reconstruction methods:** No unblinded cosmological measurements + mock challenge results, comparison of different methods.
- **Systematic error calculation:** Quote final systematic error budget for BAO

Key Paper: Broad-band measurement paper (unblinded).

- Present results of full fit RSD, AP measurements + statistical and systematic errors.
- Present results of full fit m_ν measurements + statistical and systematic errors.
- Present results of full fit f_{NL} measurements + statistical and systematic errors.
- All low redshift samples: ELG, LRG, QSO and BGS.
- Plots of $P(k)$ and $\xi(s)$ for all samples against models.
- Comparison to previous measurements.
- Match between measurements and Planck LCDM.

Key project 5 - supporting papers

- **Broad-band RSD models:** No unblinded cosmological measurements + comparison of analytic models, emulators etc., systematic error, mock challenge results, final pipeline description.
- **Broad-band m_ν models:** No unblinded cosmological measurements + comparison of different models + systematic error budget + describe final pipeline for m_ν analysis + mock challenge results.
- f_{NL} **versus systematics:** No unblinded cosmological measurements + systematic correction sensitivity + bias models, optimal weights + mock challenge results + final pipeline description.

Key project 7

Key Paper: Cosmological impact paper (unblinded).

- Comparison of DESI measurements, not previously done: Ly-α, BGS, QGC.
- Covariance for BAO+RSD DESI measurements.
- Cosmological fits to DESI+PLANCK (+BBN+WL+SN+inv distance ladder) for standard LCDM + extensions.
- Big tables of cosmological parameters with lots of numbers in them.
- Likelihood contour plots showing remaining degeneracies.
- Discussion about discrepancies with other data or between other data sets; can we resolve tensions?
- Might be expanded with extra support and alphabetical papers on depending on on-sky findings (e.g. Modified gravity constraints, specific model constraints, reconstructing the DE w(z), etc.)

We are currently looking for a 3-year postdoc in Portsmouth to contribute to the DESI preparation and science analysis

→ https://jobregister.aas.org/ad/c0893474

Please forward to anybody who might be interested and feel free to contact me if you have any questions.