Massively multiplexed spectroscopy with MSE: Science, Project and Vision

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With input from Adam Bolton & Arjun Dey
Keyword: Opportunity
Science, Project & Vision

- Amazing breath of science topics! (cf. this morning summaries)

- Several WGs identified new calculations/simulations needs, including for new ideas

- New synergies found/discussed during this meeting
  → let’s keep the communication flowing
  → particularly important for the MSE Design Reference Surveys (Jen Marshall’s talk)
Science, **Project & Vision**

- Observatory project building from a strong legacy (solid footing); design is coming together but interesting discussions with potential major design implications
  - More fibers + higher fiber density? (⇒ more spectrographs)
  - Do we need H band (all/one spectrograph)?
  - How high does HR need to go (40k, 35k, 30k)?
  - Can we do without the LR mode?

- Full project can further draw from recent or near-future survey projects (e.g., SDSS, Gaia, WEAVE, 4MOST, DESI, PFS, LAMOST, …) + ESO Phase 3 + Science platforms (NOAO Data Lab, STSci MAST, IPAC IRSA, CDS, etc.)

“**Build the principle of community**” – Adam Burgasser
Science, Project & Vision

- The vision is defined “in good company” in a scientific landscape with growing survey & data-intensive science

- New territory accessible with combination of aperture, multiplexing, and sensitivity

- MSE as part of a network:
  - following-up from multi-wavelength imaging surveys
  - identifying especially interesting targets for the ELTs
MSE as a Science Platform

- Go beyond archiving data
- **Deliver analysis tools**: default toolkit (+user contributed?)
- Create collaborative work spaces
- Help solve diversity/accessibility problems

**How?**

- Let’s share workload & wisdom with other platforms
  - Interoperability between projects/archives/centers?
  - Coordinated (if not centralized) effort → incl. writing White Papers!
  - *Advanced & strategic thinking required!*
MSE as a Science Platform

“Everything up to writing the paper(s)”
Astro2020 White Papers

- March 11 deadline

- All WGs commented on currently known level of effort

- Coordination & compilations of planned/submitted papers:
  - https://www.noao.edu/astro2020hub/ (list + form to submit new entries)
  - Slack Channel: AstroSlack2020
  - https://sites.google.com/view/astro2020-wps/home (spreadsheet + form to submit new entries)
Astro2020 White Papers

“Let’s write them”
NOAO as a partner

- Long history of pioneering survey operations and support for survey science
- NOAO’s 4m telescopes are moving toward high-impact instruments dedicated to long-term projects + ease of operation
- Data systems development has focused on providing services for science with big data
  - Data Lab
  - Antares
- Coming soon: NCOA = LSST+Gemini+NOAO
  Can plan strategically across all platforms to support community desires
Questions to keep in mind

- What do we want MSE to look like (observatory, data, science platform)?

- How can we move forward with designing the science and instrument in optimal/coordinated way?

- What are the roles of MSE for the astronomy community (break-through discoveries, training of future generations, outreach, opportunity for Open)?

- What are the crazy ideas?
Thanks!

- Organizing Committee
- All Speakers, Discussion leaders, Session chairs
- Special thanks to amazing work by Laurie Phillips (NOAO) & Laurie Dale (CFHT)
- NSF & CFHT for support that made this meeting possible