Maunakea Spectroscopic Explorer

MSE Project Science updates

Jen Marshall
MSE Project Scientist

Andreea Petric
MSE Deputy Project Scientist

Maunakea Spectroscopic Explorer

Growth of Science Team

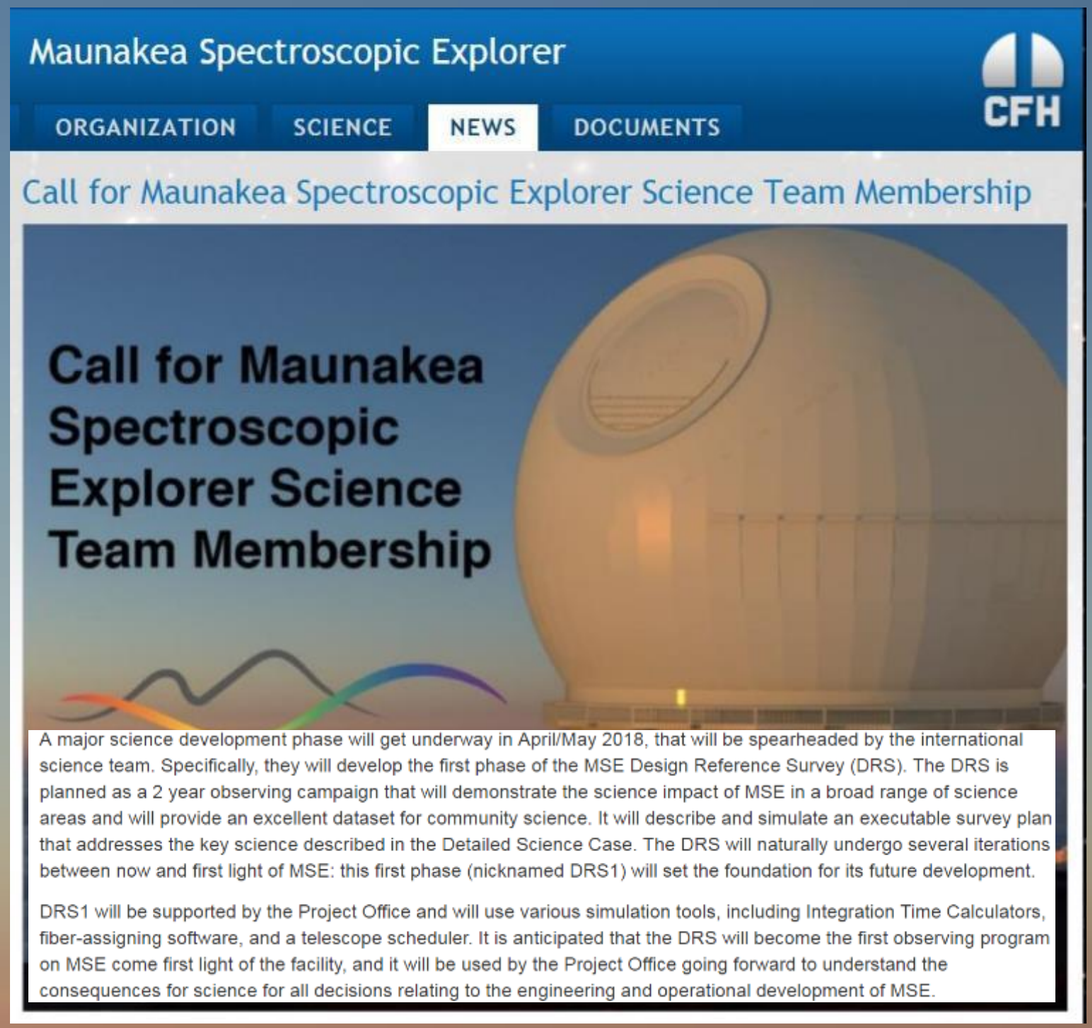
MSE's Science Team continues to grow!

Currently 422 members from 39 countries:

- Australia* – 33
- Belgium – 7
- Canada* – 38
- Chile – 7
- China* – 32
- France* – 41
- Germany – 21
- India* – 12
- Italy – 12
- S. Korea* – 6
- Spain – 14
- United Kingdom† – ~~38~~ 44
- USA† – 109
- Other – 46

* Current MSE participants

† Current MSE observers



Maunakea Spectroscopic Explorer

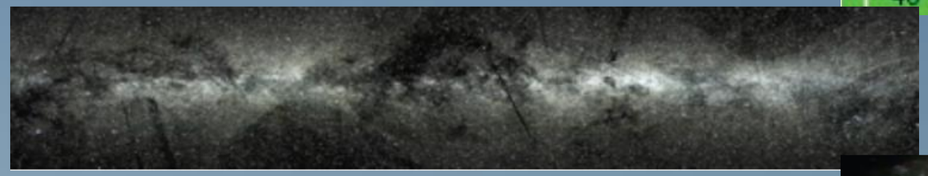
Science Working Groups

Exoplanets and stellar astrophysics

Maria Bergemann, MPIA Heidelberg; Daniel Huber, UH

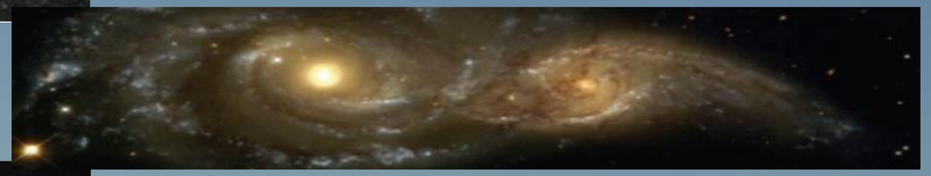
Chemical nucleosynthesis

Charli Sakari, San Francisco State; Ricardo Schiavon, Liverpool JMU



Milky Way and resolved stellar populations

Sarah Martell, UNSW; Xiaoting Fu, Kavli IAA at Peking University



Galaxy Formation and evolution

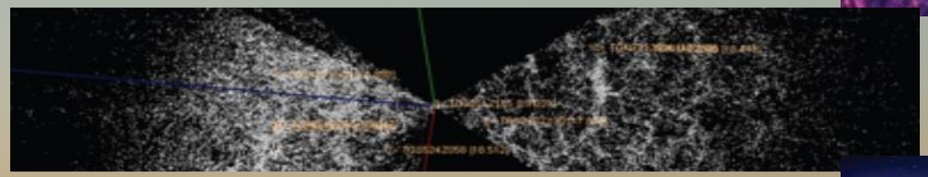
Kim-Vy Tran; Aaron Robotham, UWA

AGN and supermassive black holes

Yue Shen, University of Illinois; Manda Banerji, IfA Cambridge

Astrophysical tests of dark matter

Ting Li, Carnegie Observatories; Manoj Kaplinghat, UC Irvine



Cosmology

Will Percival, University of Waterloo; Christophe Yeche, CEA

Time domain astronomy and transients

Adam Burgasser, UC San Diego; Chien-Hsiu Lee, NOAO/NOIRLab

Maunakea Spectroscopic Explorer

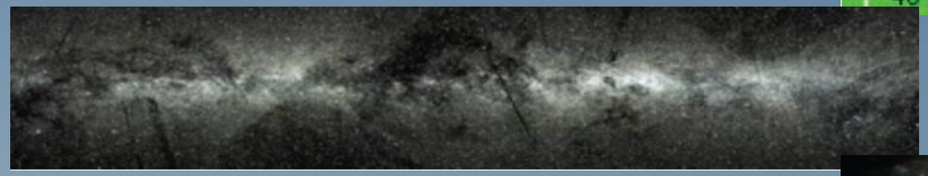
Science Working Groups

Exoplanets and stellar astrophysics

Maria Bergemann, MPIA Heidelberg; Daniel Huber, UH

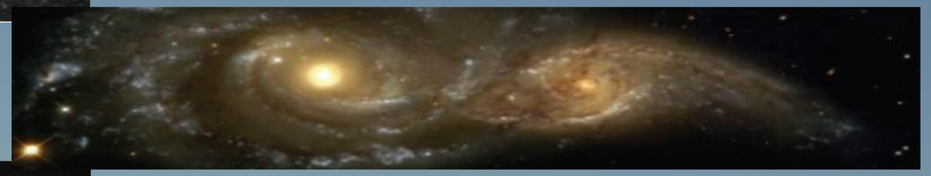
Chemical nucleosynthesis

Charli Sakari, San Francisco State; Ricardo Schiavon, Liverpool JMU



Milky Way and resolved stellar populations

Sarah Martell, UNSW; Xiaoting Fu, Kavli IAA at Peking University



Galaxy Formation and evolution

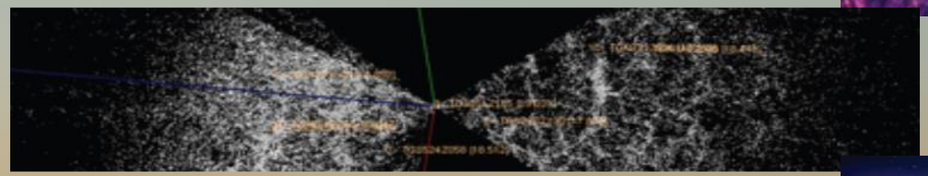
Kim-Vy Tran; Aaron Robotham, UWA

AGN and supermassive black holes

Yue Shen, University of Illinois; Manda Banerji, IfA Cambridge

Astrophysical tests of dark matter

Ting Li, Carnegie Observatories; Manoj Kaplinghat, UC Irvine



Cosmology

Will Percival, University of Waterloo; Christophe Yeche, CEA

Time domain astronomy and transients

Adam Burgasser, UC San Diego; Chien-Hsiu Lee, NOAO/NOIRLab

Maunakea Spectroscopic Explorer

Summary of recent science activities

- "Questionnaire" in 2019 surveyed science team for their requirements for enabling their science
  - Regarding spectral coverage, resolution, and target density
  - Develop and iterate top-level design requirements between science and spectrograph design teams
- Design Reference Survey
  - Key recommendation of 2018 Conceptual Design review panel was to conduct a “Design Reference Survey”, a mock observing plan for the first few years of MSE to determine whether the facility can execute all of the planned science
  - Current approach is to produce a detailed observing plan combining four diverse science cases:
    - Milky Way halo star metallicities, extragalactic survey, AGN, and cosmology
  - Findings will inform required design improvements as we prepare for Preliminary Design Phase

Maunakea Spectroscopic Explorer

MSE in program reviews

France Prospective

- Five year plan for French astronomy
- Access to CFHT/MSE was ranked P0, highest priority, in national astronomy infrastructure

Australia Mid-term review

- Mid-term review of 2016 decadal plan
- MSE participation in workshops/town hall meetings
- Final report published 7/2020
- MSE mentioned as a potential “new opportunity”:
- “Continue to explore paths for engagement with either MSE or an ESO-based equivalent facility.”

Canadian Long Range Plan

- White papers on MSE submitted in early 2019
- Recently released draft of report has nice things to say:

  “Our top recommendations are for two well-developed projects that were also the highest priorities in LRP2010, and are now expected to move forward in the next 2-3 years: a very large optical telescope (ranked first), and SKA1 (ranked second). We make additional unranked recommendations for MSE and the ngVLA: these two projects represent compelling future opportunities for Canada, which should be explicitly ranked once they have been fully developed.”

Maunakea Spectroscopic Explorer

MSE in program reviews

Astro2020 US decadal survey

- March 2019: Science team submitted ~20 white papers that highlighted importance of MSE
  - An additional ~70 were submitted that required massively multiplexed spectroscopy
- June 2019: Project Office submitted APC (facilities) white paper on MSE
  - https://arxiv.org/abs/1907.07192
- October 2019: Project Office responded to RFI for TRACE analysis
- Looking forward to final report in Q2 2021

Snowmass/P5

- Currently discussing MSE with the US astroparticle physics community via their ~decadal planning process
- August 2020: Science team submitted dark matter/dark energy/facility LOIs
- Now: year-long deliberation among scientists to assimilate information for the P5 review committee
- July 2021: white papers submitted
- Then: P5 (Particle Physics Project Prioritization Panel) makes funding decisions

Acknowledgement

The Maunakea Spectroscopic Explorer (MSE) conceptual design phase was conducted by the MSE Project Office, which is hosted by the Canada-France-Hawaii Telescope (CFHT). MSE partner organizations in Canada, France, Hawaii, Australia, China, India, and Spain all contributed to the conceptual design. The authors and the MSE collaboration recognize the cultural importance of the summit of Maunakea to a broad cross section of the Native Hawaiian community."