

MaNGA Focus Week

Kevin Bundy

Kavli IPMU Assistant Professor

The Kavli IPMU “MaNGA Focus Week” concluded with great success on Friday, May 24th. MaNGA stands for “Mapping Nearby Galaxies at Apache Point Observatory,” a new Sloan Digital Sky Survey that will begin in 2014 and run for six years with the aim to obtain resolved spectroscopy for an unprecedented sample of 10,000 nearby galaxies.* Kavli IPMU’s own Kevin Bundy is the Principal Investigator. The focus week served not only as an all-hands team meeting designed to advance preparations for the project but also as the Critical Design Review of the MaNGA instrumentation upgrades that are being planned for the Sloan 2.5m telescope.

An external committee of prominent experts reviewed over 200 pages of original material developed by the MaNGA team and evaluated presentations on aspects of the project that ranged from the hardware design to the observing strategy and software tools. The primary focus was a new type of “integral field unit” (IFU) design innovated by the MaNGA team, which combines up to 127 optical fibers into a tightly packed and highly regular



hexagonal array. The team demonstrated through results both in the lab and with prototypes taken on sky that their design could regularly achieve the theoretical maximum throughput of 96% in a cost-effective solution that integrates seamlessly into the existing infrastructure at Apache Point Observatory.

The review committee was highly impressed with the team's preparation and mature design, the result of an impressive and rapid effort over the last 14 months. They recommended the project proceed on track to full production and deployment in August 2014. At the same time, they helpfully identified a potential weak point in the quality of skyline subtraction that MaNGA hopes to achieve, an issue that the team is now aggressively addressing. With this positive feedback from the review, MaNGA can look forward to the first of its IFUs being constructed

* See, *Kavli IPMU News No.20*, pp. 16-17.

over the summer of 2013, and the first of ultimately six “cartridges” of MaNGA hardware ready for testing at the observatory in February 2014.

Also discussed were MaNGA's next steps which include refinements to the sample selection and observing strategy as well as the development of software analysis tools which are crucial for providing data products that will eventually be released to the public. For each of the 10,000 galaxies in the sample, MaNGA will provide maps of the internal properties

of stars and gas as well as the velocity fields of both constituents. This information will provide valuable new constraints on the life cycle of galaxies, including the physical processes that regulate their birth, continued growth at late times, and their “death” through the cessation of star formation. The ability to use velocity maps to “weigh” galaxy components will also constrain the amount of dark matter in galaxies and possibly provide tests of the dark matter profile shape and alternate gravity theories.

