Thomas R. Metcalf SPD Travel Award Conference Report

Solar Polarization Workshop 9
Max Planck Institute for Solar System Research
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Gabriel Dima is a Postdoctoral Researcher with the National Solar Observatory working with Thomas Schad on diagnostics of the coronal magnetic field. The position is located on the island of Maui, Hawaii and focuses on exploring ways of interpreting the type of coronal observations that will be available once the Daniel K. Inouye Telescope starts operations in 2020. Gabriel completed his PhD in 2017 at the University of Hawaii working with Jeff Kuhn on measurements of forbidden emission lines in the solar corona using the 0.45 m SOLARC coronagraph.

Coronal polarimetry in the DKIST era

G. Dima, T. Schad, DKIST team

Operations of the US National Science Foundation's Daniel K. Inouye Solar Telescope (DKIST) near the summit of Haleakalā in Hawaii will commence next year, ushering in a new era for solar physics, and in particular, coronal spectropolarimetry. DKIST's large-aperture obscuration-free design provides unprecedented capabilities for measuring optical and infrared coronal emission lines initially with spectral coverage from the 380 nm to the 3.9 micron Si IX line. DKIST and its first light instrumentation address many observational challenges facing O/IR coronal spectropolarimetry, including scattered light reduction, image stabilization, signal-to-noise, polarimetric accuracy, and spectral coverage, and thereby provides new opportunities to advance old concepts for interpreting coronal polarization and making inferences of the coronal thermal-magnetic conditions. Tomography and forward modeling provide viable approaches to address line-of-sight integration challenges using DKIST observations as well as coordinated observations in the EUV. At seeing-limited spatial resolution in the hot coronal lines, DKIST will probe individuated coronal intensity structures, such as loops, that in principle permit single point analysis using new techniques that exploit multi-wavelength coronal polarimetry. Such new ideas are complemented by the use of lines formed at chromospheric temperatures to probe coronal magnetism during cooling events. Along with photospheric/chromospheric diagnostics of the coronal base, coronal polarimetry at DKIST promises to help advance our understanding of the coronal environment.

I am honored to be one of this year's recipients of the Metcalf Travel Award and I am grateful to the AAS Solar Physics Division for this distinction. At this conference, Tom Metcalf's friend and collaborator KD Leka shared stories with us about their times spent working together in Hawaii. Although I only know Tom Metcalf though his papers, learning that we all lived and worked in the same place makes this award all the more meaningful. The Solar Polarization Workshop was a unique opportunity to learn more about the latest research into polarization diagnostics of the solar environment and meet with those researchers who developed the theories underpinning my own work. The feedback I received to my presentation has spurred new ideas for future research and I am excited for the possibilities.