

IAU Symposium #305: Astrophysical Polarimetry, summary for Dr. Thomas R. Metcalf Travel Award  
 Lucas A. Tarr

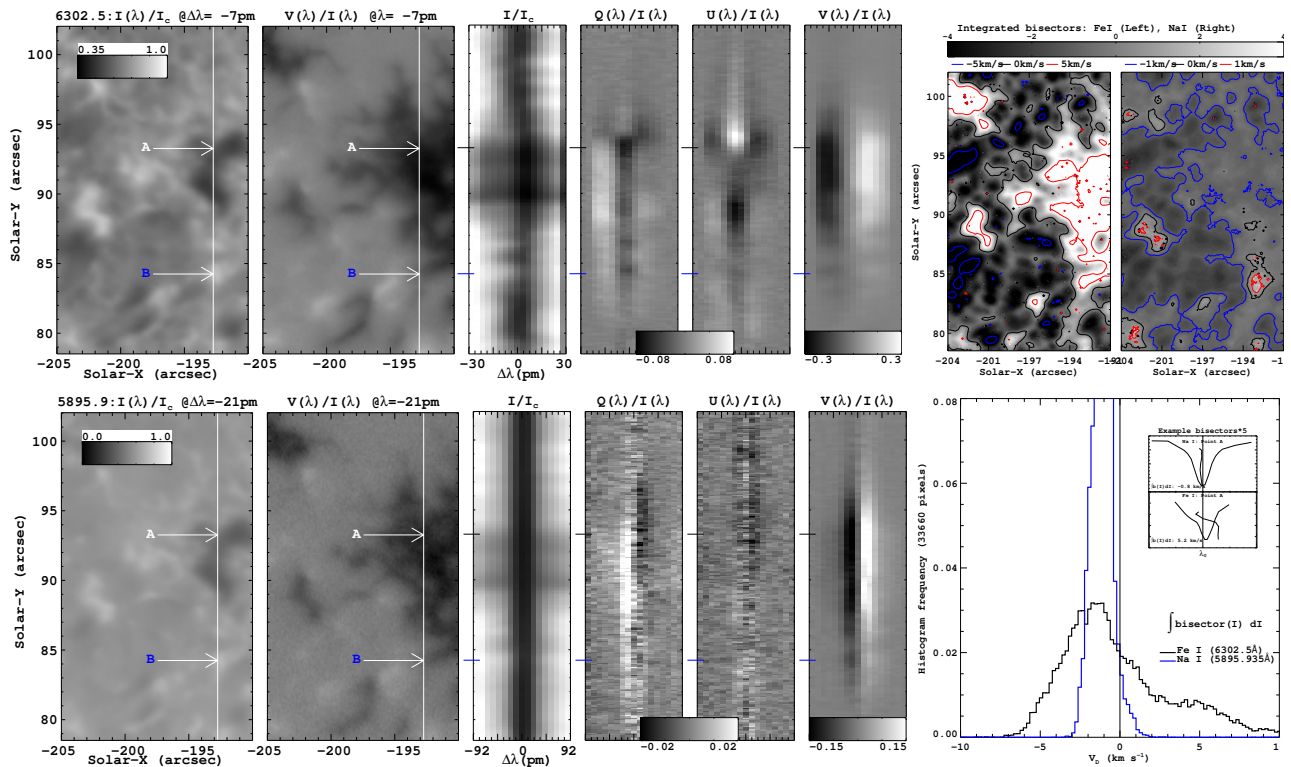
November 30- December 5, 2014, Punta Leona, Costa Rica

I presented a poster during the morning and afternoon sessions for Poster Group A—December 1 and December 2—and a short oral overview of my poster on December 1.

**Poster Title** - Inferring magnetic and plasma properties at multiple heights in the Sun's atmosphere with IBIS data

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**Abstract** - My poster described the calibration, reduction, and analysis of data from the IBIS instrument, an imaging spectropolarimeter using a Fabry-Pérot interferometer at the Dunn Solar Telescope. The data comprises near-simultaneous observations of the full Stokes vector in multiple spectral lines. Our study focused on the FeI 6302.5Å and NaI 5896Å lines, where the former is formed in the photosphere and the latter in the upper photosphere to low chromosphere. We determined the vector magnetic field by considering each line separately according to the method of Jefferies, Lites and Skumanich (1989), but found a larger field strength in NaI compared to FeI, opposite of what is expected. This led to a study of the red-blue bisectors and lobe asymmetries, which are related to velocity flows, at each pixel for each line. Because the number of wavelength steps across each line is limited (~ 15), to better constrain the inversion and determine the plasma and magnetic properties we will need to invert both lines simultaneously, which is a work in progress with these data.



**Bio** - I received my PhD in Physics from Montana State University in August, 2014, under Prof. Dana Longcope. My dissertation work quantified the storage of magnetic free energy in the coronal magnetic field due to the emergence of magnetic flux through the photosphere. The following year I was a Visiting Scientist at the High Altitude Observatory, working with Dr Phil Judge. In October 2014 I began a fellowship through the National Research Council Research Associate Program at the Naval Research Laboratory in Washington, DC. I am studying the emergence of magnetic field into a partially ionized and stratified solar atmosphere using 2D and 3D magnetohydrodynamic simulations.

I am very grateful to the Metcalf family for creating the travel fund and the Metcalf Travel Award Committee for providing me the opportunity to attend this IAU symposium. I would also like to express my debt to Thomas Metcalf himself, who greatly contributed to our understanding of the NaI 5896Å line that we have focused on in this work.

