Astrophysics Seminar
Monday March 20, 2017

Zooming In On the Distant Universe with the Most Highly Magnified Galaxies

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Dedicated searches for bright, strongly lensed galaxies have revealed a population of highly magnified sources. The most highly magnified lensed sources will forever constitute a unique and finite number of opportunities for probing the astrophysics of galaxy evolution and star formation at high redshift. Wide-field surveys of large fractions of the sky reveal on the order of a couple hundred strongly lensed high redshift galaxies that are highly magnified and optically bright (AB magnitude ~<21). These exceptional sources reveal the complexity of star formation on sub-galaxy scales during the era of peak star formation in the universe, and deep observations of strong lensing fields are pushing the frontier of our ability to study the most distant galaxies known. I will summarize results from the Sloan Giant Arcs Survey (SGAS), with an emphasis on unique observations that are enabled by high-magnification systems. I will also discuss the exciting first results from a deep spectroscopic follow-up program, the Magellan Evolution of Galaxies Spectroscopic and Ultraviolet Reference Atlas (MEGaSaURA). The MEGaSaURA project is comprised of high signal-to-noise, moderate resolution rest-frame UV spectra of 15 of the brightest known lensed galaxies, at redshifts of $1.7<z<3.6$. The individual MEGaSaURA spectra reveal a wealth of spectral diagnostics: absorption from the outflowing wind; photospheric absorption lines and P Cygni profiles from the massive stars that power the outflow; and faint nebular emission lines from the HII regions produced by those stars. The stacked MEGaSaURA data form the best spectrum yet obtained for star-forming galaxies at these redshifts, surpassing previous data in both wavelength coverage and spectral resolution. This stack reveals additional rest-UV spectral diagnostics, and is the ideal place to refine our toolkit for deducing the properties of the first galaxies and stars in the Universe with the next generation of observational facilities (e.g., JWST, 30m-class telescopes).

3:30pm in CAS 502. *Refreshments served at 3:15pm in CAS 500.*

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Next Week
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