Friday, January 04, 2013

You have nothing scheduled for this day

Saturday, January 05, 2013

You have nothing scheduled for this day

Sunday, January 06, 2013

You have nothing scheduled for this day

Monday, January 07, 2013

<table>
<tr><th>Time</th><th>Session Info</th></tr>
<tr><td colspan="2">9:00 AM-6:30 PM, Exhibit Hall A (Long Beach Convention Center), Circumstellar Disks</td></tr>
<tr><td>9:00 AM-6:30 PM</td><td>144.22. Extreme Contrast Direct Imaging of Planets and Debris disks with the Palomar P3K Adaptive Optics System and the Vector Vortex Coronagraph M. Wahl; S.A. Metchev; R. Patel; G. Serabyn</td></tr>
<tr><td colspan="2">9:00 AM-6:30 PM, Exhibit Hall A (Long Beach Convention Center), Extrasolar Planets: Detection</td></tr>
<tr><td>9:00 AM-6:30 PM</td><td>149.13. 2013 Program to Discover Nearby Planets with Mesolensing R. Di Stefano; C. Crockett; J. Greiner; S. Lepine; J. Matthews; W. Nimitpattana; F. Primini; K.C. Sahu; J. Scargle; J. Smith; J. Turner; F.M. Walter</td></tr>
<tr><td colspan="2">9:00 AM-6:30 PM, Exhibit Hall A (Long Beach Convention Center), Stars, Cool Dwarfs, Brown Dwarfs</td></tr>
<tr><td>9:00 AM-6:30 PM</td><td>158.28. HST and Spitzer Rotational Phase Mapping of Brown Dwarf Atmospheres D. Apai; E. Buenzli; J. Radigan; A.S. Burrows; S.A. Metchev; D.C. Flateau; I.N. Reid; A. Heinze; R. Jayawardhana</td></tr>
<tr><td colspan="2">10:00 AM-11:30 AM, Room 102B (Long Beach Convention Center), Young Stellar Objects, Very Young Stars, T-Tauri Stars, H-H Objects</td></tr>
<tr><td>10:30-10:40 AM</td><td>117.04. Hot Gas Flows in T Tauri Stars D.R. Ardila; G. Herczeg; S.G. Gregory; L. Ingleby; K. France; A. Brown; S. Edwards; J. Linsky; H. Yang; J.A. Valenti; C.M. Johns-Krull; R. Alexander; E.A. Bergin; T. Bethell; J. Brown; N. Calvet; C. Espaillat; A. Hervé; L. Hillenbrand; G. Hussain; E. Roueff; E. Schindhelm; F.M. Walter</td></tr>
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Tuesday, January 08, 2013

Time	Session Info

9:00 AM-6:30 PM, Exhibit Hall A (Long Beach Convention Center), **Computation, Data Handling, Image Analysis**	
9:00 AM-6:30 PM	**240.14. Exploring the Effects of Large Networks on Evolution in Low Mach Number Flows** R. Orvedahl; M. Zingale; A. Almgren; J. Bell; A. Nonaka
9:00 AM-6:30 PM, Exhibit Hall A (Long Beach Convention Center), **Supernovae**	
9:00 AM-6:30 PM	**253.21. Double White Dwarf Mergers with CASTRO** M.P. Katz; M. Zingale; A. Calder; F.D. Swesty
9:00 AM-6:30 PM, Exhibit Hall A (Long Beach Convention Center), **Young Stellar Objects, Very Young Stars, T-Tauri Stars, H-H Objects**	
9:00 AM-6:30 PM	**256.05. Young, Low-Mass Spectroscopic Binaries with Unusual Properties** D.A. Ruiz; K. Kellogg; L.A. Prato; G. Torres; L.H. Wasserman; R. Neuhäeuser
10:00 AM-11:30 AM, Grand Ballroom (Long Beach Convention Center), **Galaxies I**	
11:00-11:20 AM	**206.05D. Giant Molecular Clouds and Star Formation in Nearby Spiral Galaxies** D. Rebolledo; T.H. Wong; A.K. Leroy; J. Koda; J. Donovan Meyer
2:00 PM-3:30 PM, Room 102C (Long Beach Convention Center), **Turbulence: Theory and Observation**	
2:50-3:00 PM	**235.05. Systematic Variations of the CO J=2-1/1-0 Ratio Between the Arm and Interarm Regions of M51** J. Koda; N. Scoville; T. Hasegawa; D. Calzetti; J. Donovan Meyer; F. Egusa; R.C. Kennicutt; N. Kuno; M. Louie; R. Momose; T. Sawada; K. Sorai; M. Umei

Wednesday, January 09, 2013

Time	Session Info
9:00 AM-6:30 PM, Exhibit Hall A (Long Beach Convention Center), **Education and Professional Development**	
9:00 AM-6:30 PM	**342.02. Michelson-type Radio Interferometer for University Education** J. Koda; J.W. Barrett; T. Hasegawa; M. Hayashi; G. Shafto; J. Slechta
2:00 PM-3:30 PM, Grand Ballroom (Long Beach Convention Center), **Direct Detection of Exoplanets, Faint Companions, and Protoplanetary Disks**	
2:30-2:40 PM	**324.04. Disk Emission Across the Stellar/Substellar Boundary in Taurus** J. Patience; J. Bulger; H. Bouy; J. Monin; C. Pinte; F. Menard; J. Koda; C.D. Dowell

Thursday, January 10, 2013

Time	Session Info
9:00 AM-6:30 PM, Exhibit Hall A (Long Beach Convention Center), **Stellar Topics**	
9:00 AM-6:30 PM	**443.01. A Survey of Substellar Atmospheric Properties in L/T-transition and Peculiar Brown Dwarfs from a SDSS/2MASS Cross-match** K. Kellogg
9:00 AM-6:30 PM	**443.15. An Investigation into the Parameters of Photospheric Radius Expansion X-ray Bursts** M. Von Steinkirch; J.M. Lattimer; A. Calder
9:00 AM-6:30 PM	**443.20. Model Independent Determination of Electron Fraction for Individual SNIa** S. De; F. Timmes; W. Hawley; D. Chamulak; T. Athanassiadou; D. Jack; A. Calder; E. Brown; D. Townsley
9:00 AM-6:30 PM, Exhibit Hall A (Long Beach Convention Center), **Supernovae**	
9:00 AM-6:30 PM	**444.02. From Convection to Ignition and Beyond: A (Computational) Story of M_{Ch} SNIa** C.M. Malone; A. Nonaka; A. Almgren; J. Bell; S. Dong; H. Ma; S.E. Woosley; M. Zingale

Final ID: 144.22

Extreme Contrast Direct Imaging of Planets and Debris disks with the Palomar P3K Adaptive Optics System and the Vector Vortex Coronagraph

M. Wahl; [1]; *S. A. Metchev;* [1]; *R. Patel;* [1]; *G. Serabyn;* [2];
1. Stony Brook University, Northport, NY, United States.
2. JPL, Pasedena, CA, United States.

Abstract (2,250 Maximum Characters): We present first results from using the PALM-3000 extreme adaptive optics system and imaging camera on the Hale 5m telescope. Observations using the vector vortex coronagraph have given us direct detections of the planets in the HR8799 system and the dusty debris disk around the star HD141569A. Due to the unprecedented inner working angle of the VVC, the data show a clearing within the inner ring inwards to ~20AU along the projected semi-major axis. Our observations of the disk in the K band (2.2μm) demonstrate the power of the next generation of adaptive optics systems coupled with phase mask coronagraphy. We also show a comparison of the data reduction techniques currently being implemented in the direct imaging field. Specifically, the Locally Optimized Combination of Images (LOCI) and the Karhunen-Loeve Image Processing (KLIP) algorithms, the latter being a more robust method for resolving debris disks.

Final ID: 149.13

2013 Program to Discover Nearby Planets with Mesolensing

R. Di Stefano; [1]; *C. Crockett;* [5]; *J. Greiner;* [3]; *S. Lepine;* [2]; *J. Matthews;* [1]; *W. Nimitpattana;* [1]; *F. Primini;* [1]; *K. C. Sahu;* [4]; *J. Scargle;* [6]; *J. Smith;* [7]; *J. Turner;* [8]; *F. M. Walter;* [9];

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2. American Museum of Natural History, New York, NY, United States.
3. MPE, Garching, Germany.
4. STSci, Baltimore, MD, United States.
5. Naval Observatory Flagstaff Station, Flagstaff, AZ, United States.
6. NASA Ames, Moffett Field, CA, United States.
7. Austin Peay State Univ., Clarksville, TN, United States.
8. .University of Arizona, Tucson, AZ, United States.
9. Stony Brook University, Stony Brook, NY, United States.

Abstract (2,250 Maximum Characters): We report on plans for a new program to discover nearby planets through their actions as gravitational lenses. Although only about 2% of the known exoplanets have been discovered by lensing studies, theoretical investigations during the past few years have established that lensing events can reveal the presence of many more planets, in a wide range of orbits. Furthermore, many of the planets we can discover are nearby, allowing for follow-up observations, including additional planet searches conducted through complementary methods, such as radial-velocity, transit, and direct imaging studies. In addition to outlining the key elements and new features of our program, which will begin during the spring of 2013, we will invite participation by the community.

Final ID: 158.28

HST and Spitzer Rotational Phase Mapping of Brown Dwarf Atmospheres

D. Apai; [1]; *E. Buenzli;* [1]; *J. Radigan;* [3]; *A. S. Burrows;* [4]; *S. A. Metchev;* [5]; *D. C. Flateau;* [1]; *I. N. Reid;* [3]; *A. Heinze;* [5]; *R. Jayawardhana;* [2];

1. The University of Arizona, Tucson, AZ, United States.
2. University of Toronto, Toronto, ON, Canada.
3. Space Telescope Science Institute, Baltimore, MD, United States.
4. Princeton University, Princeton, NJ, United States.
5. Stony Brook University, New York, NY, United States.

Abstract (2,250 Maximum Characters): The physics and chemistry of condensate clouds play pivotal but poorly understood roles in the atmospheric structure and composition of ultracool brown dwarfs and giant exoplanets. Unresolved observations can only provide limited insights into the structure of clouds or the processes behind the transition from the cloudy L-type sources to the cloud-free T-type ones.

We will review exciting results from a new technique, rotational phase mapping, of ultracool atmospheres. Using precision infrared Spitzer photometry and HST spectroscopy covering entire rotation periods of brown dwarfs, we have obtained detailed spectrally and spatially resolved information of their atmospheres.

The key results include the identification of cloud structures in L/T brown dwarfs, evidence for longitudinal and vertical cloud heterogeneities, and spectral constraints on the composition and types of clouds. We show that L/T transition brown dwarfs often have thin cloud covers with patches of cold, thick clouds, which introduce strong but only weakly wavelength-dependent extinction. The same thick cloud patches seen in our varying brown dwarf targets, if extended to the entire surface, predict near-infrared colors/magnitudes matching the range occupied by the "underluminous" directly imaged exoplanets. This supports the models in which thick clouds are responsible for the near-infrared properties of underluminous exoplanets.

Final ID: 117.04

Hot Gas Flows in T Tauri Stars

D. R. Ardila; [3]; *G. Herczeg;* [2]; *S. G. Gregory;* [1]; *L. Ingleby;* [4]; *K. France;* [5]; *A. Brown;* [5]; *S. Edwards;* [6]; *J. Linsky;* [7]; *H. Yang;* [15]; *J. A. Valenti;* [8]; *C. M. Johns-Krull;* [9]; *R. Alexander;* [10]; *E. A. Bergin;* [4]; *T. Bethell;* [4]; *J. Brown;* [14]; *N. Calvet;* [4]; *C. Espaillat;* [4]; *A. Hervé;* [12]; *L. Hillenbrand;* [1]; *G. Hussain;* [11]; *E. Roueff;* [12]; *E. Schindhelm;* [5]; *F. M. Walter;* [13];

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6. Five College Astronomy, Smith College, Northampton, MA, United States.
7. JILA, University of Colorado and NIST, Boulder, CO, United States.
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10. Department of Physics & Astronomy, University of Leicester, Leicester, United Kingdom.
11. Max-Planck-Institut für extraterrestrische Physik, Garching, Germany.
12. Observatoire de Paris, Meudon, France.
13. Department of Physics and Astronomy, Stony Brook University, Stony Brook, NY, United States.
14. Harvard-Smithsonian Center for Astrophysics, Cambridge, MA, United States.
15. Institute for Astrophysics, Central China Normal University, Wuhan, China.

Abstract (2,250 Maximum Characters): We describe observations of the hot gas (~1e5 K) ultraviolet lines C IV and He II, in Classical and Weak T Tauri Stars (CTTSs, WTTSs). Our goal is to provide observational constraints for realistic models. Most of the data for this work comes from the Hubble proposal “The Disks, Accretion, and Outflows (DAO) of T Tau stars” (PI Herczeg). The DAO program is the largest and most sensitive high resolution spectroscopic survey of young stars in the UV ever undertaken and it provides a rich source of information for these objects. The sample of high resolution COS and STIS spectra presented here comprises 35 stars: one Herbig Ae star, 28 CTTSs, and 6 WTTSs.

For CTTSs, the lines consist of two kinematic components. The relative strengths of the narrow and broad components (NC, BC) are similar in C IV but in He II the NC is stronger than the BC, and dominates the line profile. We do not find correlations between disk inclination and the velocity centroid, width, or shape of the CIV line profile. The NC of the C IV line in CTTSs increases in strength with accretion rate, and its contribution to the line increases from ~20% to ~80%, for the accretion rates considered here (1e-10 to 1e-7 Msun/yr). The CTTSs C IV lines are redshifted by ~20 km/s while the CTTSs He II are redshifted by ~10 km/s. Because the He II line and the C IV NC have the same width in CTTSs and in WTTSs, but are correlated with accretion, we suggest that they are produced in the stellar transition region.

The accretion shock model predicts that the velocity of the post-shock emission should be 4x smaller than the velocity of the pre-shock emission. Identifying the post-shock emission with the NC and the pre-shock with the BC, we find that this is approximately the case in 11 out of 23 objects. The model cannot explain 11 systems in which the velocity of the NC is smaller than the velocity of the BC, or systems in which one of the velocities is negative (five CTTSs). The hot gas lines in some systems such as HN Tau, RW Aur A, AK Sco, DK Tau, T Tau N, and V1190 Sco require an outflow contribution, which may come from jet shocks in the observed outflows. We suggest that a hot wind is being launched by the Herbig Ae star DX Cha.

Final ID: 240.14

Exploring the Effects of Large Networks on Evolution in Low Mach Number Flows

R. Orvedahl; [1]; *M. Zingale;* [1]; *A. Almgren;* [2]; *J. Bell;* [2]; *A. Nonaka;* [2];
1. Department of Physics and Astronomy, Stony Brook University, Stony Brook, NY, United States.
2. Center for Computational Sciences and Engineering, Lawrence Berkeley National Laboratory, Berkeley, CA, United States.

Abstract (2,250 Maximum Characters): Many phenomena in Astrophysics are largely subsonic and require special techniques for long-time integration. MAESTRO is a low Mach number stellar hydrodynamics code that can be used to simulate long-time, low-speed flows that would be extremely time consuming using traditional compressible codes. MAESTRO filters sound waves while retaining both local and large-scale compressibility which gives increased accuracy and efficiency. In this project we describe the results of applying MAESTRO to thermonuclear flames (thin propagating thermonuclear fusion fronts) as well as the convective layer of a nova. The nova is a carbon-oxygen white dwarf with a hydrogen-helium envelope in tight hydrostatic equilibrium. As the envelope increases in mass, the pressure and temperature increase at the base of the accreted layer. When the pressure and temperature are sufficiently high, nuclear fusion (burning) occurs. To capture this burning, MAESTRO models multiple species using the mass density of the fluid and the mass fraction of the species. A typical MAESTRO carbon burning reaction network only carries 3 species; C12, O16 and Mg24. We present the results of combining the extensive reaction network of the Modules for Experiments in Stellar Astrophysics (MESA) code with the MAESTRO code. MESA provides various values including atomic mass and atomic weight for over 5400 isotopes. We apply these large networks to study the dynamics of the convective layer in the nova as well as the dynamics of thermonuclear flames.
This work was supported in part by a DOE/Office of Nuclear Physics grant No. DE-FG02-06ER41448 to Stony Brook.

Final ID: 253.21

Double White Dwarf Mergers with CASTRO

M. P. Katz; [1]; *M. Zingale;* [1]; *A. Calder;* [1]; *F. D. Swesty;* [1];
1. Stony Brook University, Stony Brook, NY, United States.

Abstract (2,250 Maximum Characters): Type Ia supernovae are among the brightest explosions in the Universe and are recognized as reliable distance indicators. While the accepted cause of these events is the thermonuclear incineration of white dwarf stars instigated by accretion, the characteristics of the donor stars remain under investigation. Recent observational evidence supports the hypothesis that the progenitors of some events are binary white dwarf systems, and has spurred renewed theoretical interest in a merger scenario. We present preliminary work modeling such a system using the modern, three-dimensional compressible hydrodynamics code CASTRO. CASTRO uses an adaptive Eulerian grid to highly resolve features of interest and has been demonstrated to accurately address typical dynamical problems in astrophysics. We present simulations showing that it is an appropriate tool for the case of white dwarfs orbiting each other under Newtonian gravity. We show the capability of the code to conserve energy and angular momentum over multiple orbits, and we discuss the differences between simulations in inertial and co-rotating reference frames. We also present verification tests of the gravity solver and describe the importance of appropriate boundary conditions. With the success of these verification tests, the next step is to apply CASTRO to the inspiral and onset of mass transfer and determine areas of likely nuclear burning. This work was supported in part by the NSF under award AST-1211563.

Final ID: 256.05

Young, Low-Mass Spectroscopic Binaries with Unusual Properties

D. A. Ruiz; [1]; *K. Kellogg;* [2]; *L. A. Prato;* [1]; *G. Torres;* [3]; *L. H. Wasserman;* [1]; *R. Neuhäeuser;* [4];
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2. Stony Brook University, Long Island, NY, United States.
3. Harvard-Smithsonian Center for Astrophysics , Cambridge, MA, United States.
4. Astrophysikalisches Institut, Jena, Germany.

Abstract (2,250 Maximum Characters): Young, low-mass spectroscopic binary stars offer the possibility to resolve the orbits and thereby determine the dynamical mass ratio and masses of the components with high accuracy. This is needed to improve evolutionary models for low-mass stars. RX J0513.1+0851, RX J0539.9+0956 and TWA 3A were initially observed as young, low-mass, single-lined spectroscopic binary systems at visible wavelengths. In order to identify these systems as double-lined rather than single-lined, we observed them with high resolution, near-infrared spectroscopy, taken with the Keck II Telescope, applying the power of infrared spectroscopy in the detection of cool secondaries. We used two- dimensional cross-correlation analysis to measure the radial velocities of the individual components and estimate their spectral types, vsini values, and flux ratios. We found that RX J0513.1+0851 and RX J0539.9+0956 are fast rotators, 60 km/s and 80 km/s, respectively; this adds significant difficulty to the detection of the secondary component because of the broad absorption lines. TWA 3A has a vsini of ~10 km/s and eccentricity ~0.6; this system possesses an actively accreting circumbinary disk, unusual for systems of its age, ~10 Myr. We derived the orbital parameters for each system; the mass ratios and orbital periods are q=0.45±0.02 and ~4 days for RX J0513.1+0851, q=0.74±0.14 and ~1119 days for RX J0539.9+0956, and q=0.84±0.05 and ~35 days for TWA 3A.
Partial support for this work was provided by NSF grant AST-1009136 (to LP).

Final ID: 206.05D

Giant Molecular Clouds and Star Formation in Nearby Spiral Galaxies

D. Rebolledo; [1]; *T. H. Wong;* [1]; *A. K. Leroy;* [2]; *J. Koda;* [3]; *J. Donovan Meyer;* [3];
1. University of Illinois Urbana-Champaign, Urbana, IL, United States.
2. NRAO, Charlottesville, VA, United States.
3. Stony Brook University, Stony Brook, NY, United States.

Abstract (2,250 Maximum Characters): We present high spatial resolution observations of giant molecular clouds (GMCs) in the eastern part of the nearby spiral galaxy NGC 6946 obtained with the Combined Array for Research in Millimeter-wave Astronomy (CARMA). For NGC 6946, we have observed CO(1→0), CO(2→1) and 13CO(1→0), achieving spatial resolutions of 5.4"×5.0", 2.5"×2.0", and 5.6" × 5.4", respectively, over a region of 6 × 6 kpc. This region extends from 1.5 kpc to 8 kpc galactocentric radius, thus avoiding the intense star formation in the central kpc. We have recovered short-spacing u-v components by using single dish observations from the Nobeyama 45 m and IRAM 30 m telescopes. Using the automated CPROPS algorithm, we identified 45 CO cloud complexes in the CO(1→0) map and 64 GMCs in the CO(2→1) maps. The sizes, line widths, and luminosities of the GMCs are similar to values found in other extragalactic studies. We have classified the clouds into on-arm and inter-arm clouds based on the stellar mass density traced by the 3.6μm map. Clouds located on-arm present in general higher star formation rates than clouds located in inter-arm regions. Although the star formation efficiency shows no systematic trend with galactocentric radius, some on-arm clouds—which are more luminous and more massive compared to inter-arm GMCs—are also forming stars more efficiently than the rest of the identified GMCs. We find that these structures appear to be located in two specific regions in the spiral arms. One of them shows a strong velocity gradient, suggesting that this region of high star formation efficiency may be the result of gas flow convergence. In order to increase the number of clouds in our sample and the range in their properties, we have extended the same observation strategy that we performed in NGC 6946 to two additional nearby spiral galaxies, NGC 5457 (M101) and NGC 628. We will show the first results of our study of the molecular gas and star formation in these two galaxies, and we will discuss how they compare to the properties found in NGC 6946.

Final ID: 235.05

Systematic Variations of the CO J=2-1/1-0 Ratio Between the Arm and Interarm Regions of M51

J. Koda; [1]; *N. Scoville;* [2]; *T. Hasegawa;* [3]; *D. Calzetti;* [4]; *J. Donovan Meyer;* [1]; *F. Egusa;* [5]; *R. C. Kennicutt;* [6]; *N. Kuno;* [7]; *M. Louie;* [1]; *R. Momose;* [8]; *T. Sawada;* [3, 9]; *K. Sorai;* [10]; *M. Umei;* [10];

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3. NAOJ Chile, Santiago, Chile.
4. UMASS, Amherst, MA, United States.
5. JAXA, Tokyo, Japan.
6. Cambridge, Cambridge, United Kingdom.
7. Nobeyama Radio Observatory, Minamisaku, Japan.
8. U. Tokyo, Kashiwa, Japan.
9. JAO, Santiago, Chile.
10. Hokkaido U., Sapporo, Japan.

Abstract (2,250 Maximum Characters): We report systematic variations in the emission line ratio of the CO J=2-1 and J=1-0 transitions (R2-1/1-0) in the grand-design spiral galaxy M51. The R2-1/1-0 ratio shows clear evidence for the evolution of molecular gas from the upstream interarm regions, passage into the spiral arms and back into the downstream interarm regions. In the interarm regions, R2-1/1-0 is typically <0.7 (and often 0.4-0.6). However, the ratio rises to >0.7 (often 0.8-1.0) in the spiral arms, particularly at the leading (downstream) edge of the molecular arms. R2-1/1-0 is also high, ~0.8-1.0, in the central region of M51. Analysis using the Large Velocity Gradient radiative transfer calculation suggests that cold and low density gas (~<10K, ~<300 cm-3) is required for the interarm giant molecular clouds (GMCs), but this gas must become warmer and/or denser in the more active star forming spiral arms. The ratio R2-1/1-0 is higher in areas of high 24micron dust surface brightness (which is an approximate tracer of star formation rate surface density) and high CO(1-0) integrated intensity (i.e., a well-calibrated tracer of total molecular gas surface density). The systematic enhancement of the CO(2-1) line relative to CO(1-0) in luminous star forming regions suggests that some caution is needed when using CO(2-1) as a tracer of bulk molecular gas mass, especially when galactic structures are resolved.

Final ID: 342.02

Michelson-type Radio Interferometer for University Education

J. Koda; [1]; *J. W. Barrett;* [1]; *T. Hasegawa;* [2]; *M. Hayashi;* [3]; *G. Shafto;* [1]; *J. Slechta;* [1];
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2. NAO-Japan Chile Observatory, Santiago, Chile.
3. NAO-Japan, Tokyo, Tokyo, Japan.

Abstract (2,250 Maximum Characters): Despite the increasing importance of interferometry in astronomy, the lack of educational interferometers is an obstacle to training the futue generation of astronomers. Students need hands-on experiments to fully understand the basic concepts of interferometry. Professional interferometers are often too complicated for education, and it is difficult to guarantee access for classes in a university course. We have built a simple and affordable radio interferometer for education and used it for an undergraduate and graduate laboratory project. This interferometer's design is based on the Michelson \& Peace's stellar optical interferometer, but operates at a radio wavelength using a commercial broadcast satellite dish and receiver. Two side mirrors are surfaced with kitchen aluminum foil and slide on a ladder, providing baseline coverage. This interferometer can resolve and measure the diameter of the Sun, a nice daytime experiment which can be carried out even under a marginal weather (i.e., partial cloud coverage). Commercial broadcast satellites provide convenient point sources. By comparing the Sun and satellites, students can learn how an interferometer works and resolves structures in the sky.

Final ID: 324.04

Disk Emission Across the Stellar/Substellar Boundary in Taurus

J. Patience; [1, 2]; *J. Bulger;* [2]; *H. Bouy;* [3]; *J. Monin;* [4]; *C. Pinte;* [4]; *F. Menard;* [4]; *J. Koda;* [5]; *C. D. Dowell;* [6];
1. ASU, Tempe, AZ, United States.
2. University of Exeter, Exeter, Devon, United Kingdom.
3. LAEFF, Madrid, Spain.
4. IPAG, Grenoble, France.
5. Stony Brook University, Stony Brook, NY, United States.
6. Caltech, Pasadena, CA, United States.

Abstract (2,250 Maximum Characters): Disks are central ingredients for the formation of stars and planets, since they contain the material to fuel the accretion onto the central star, transport and regulate the angular momentum of the system, provide the energy for launching jets, and provide the birth sites of planets. With a combination of far-IR, submm and mm measurements from the PACS instrument onboard the Herschel Space Observatory, the SHARCII array at the CSO, and the MAMBO-II array at IRAM, we have observed a sample of 30 low mass stars and brown dwarfs in the Taurus star-forming regions, spanning the M2-M9 spectral types that encompass low mass stars and brown dwarfs. Of the 22 targets observed with Herschel at 70um and 160um, 15 targets observed with SHARCII at 350μm and the 16 targets observed with MAMBO at 1.2mm, 21 are detected in at least one measurement, most for the first time at these wavelengths. The fluxes range from 2.8 mJy at 1.2mm for the brown dwarf CFHT Tau 6 to 2.6 Jy at 350μm for the low mass star IRAS04158. In conjunction with previously reported fluxes at other wavelengths, we have modeled the SEDs of these systems with the radiative transfer code MCFOST to estimate disk properties.

Final ID: 443.01

A Survey of Substellar Atmospheric Properties in L/T-transition and Peculiar Brown Dwarfs from a SDSS/2MASS Cross-match

K. Kellogg; [1];
1. SUNY Stony Brook University, Stony Brook, NY, United States.

Abstract (2,250 Maximum Characters): Brown dwarfs, particularly L- and T-types, are unique objects because their effective temperatures span the condensation points of various chemical compounds. Their spectra are dominated by features of molecular gas and of molecules which have condensed out of the gas to form clouds. We are studying a broad sample of brown dwarfs that are either in the process of sedimenting dust from their atmospheres, or have peculiar atmospheric characteristics, such as low surface gravities, metallicities, or unusual cloud properties. The candidates are identified through photometric color selection techniques in a cross-correlation of the SDSS and 2MASS databases. They represent a sample to survey in detail the range of atmospheric conditions in substellar atmospheres, and to accurately determine the population properties and evolutionary paths of substellar objects. Our study has uncovered 16 candidate peculiar late M- to late L-dwarfs which are either completely new objects or were previously discovered but had no published spectra. With spectroscopic observations, we confirmed that three from this sample and one from a larger, not necessarily peculiar candidate sample, are moderately peculiar; giving us a few more reference points on the scale of peculiarities.

Final ID: 443.15

An Investigation into the Parameters of Photospheric Radius Expansion X-ray Bursts

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Abstract (2,250 Maximum Characters): The determination of the equation of state (EoS) of the cold ultradense matter in the core of neutron stars (NS) has been one of the biggest challenges of high-energy astrophysics. This EoS can be constrained if the NS masses and radii are determined from observational methods. For instance, these parameters can be obtained from some X-ray bursting NS's; some of which can be strong enough to reach the Eddington luminosity and will exhibit photosperic radius expansion (PRE) bursts. These events give us insight into the underlying NS's compactness, which simultaneously leads to estimates of their masses and radii. At present, there is some disagreement over the interpretation of these bursts, resulting in relatively small or large radius estimates. An open question to be investigated is whether or not the touchdown is the moment when the photosphere coincides with the neutron star surface. We present preliminary results from studies on the PRE X-ray bursts aiming towards discerning and characterizing differences in the interpretation of these events. This work was supported in part by the DOE under grant DE-FG02-87ER40317.

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Model Independent Determination of Electron Fraction for Individual SNIa

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Abstract (2,250 Maximum Characters): Ye of individual supernova Type Ia at the time of explosion by using the silicon, sulfur, and calcium features from single epoch and multi-epoch spectra near maximum light. Most one-dimensional Chandrasekhar mass models of supernova Type Ia in the single-degenerate scenario produce their intermediate-mass elements in a burn to quasi-nuclear statistical equilibrium between the mass shells 0.8 and 1.1 M. We find a near linear dependence of the intermediate-mass element nuclear yields on the white dwarf's initial metallicity from such SNe Ia explosion models, and the effect this dependence has on synthetic spectra near maximum light. We demonstrate that these metallicity signatures are only due to material achieving the necessary thermodynamic conditions. In addition, we find that global abundance of silicon is insensitive to change in metallicity but sulfur and calcium abundances change significantly

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From Convection to Ignition and Beyond: A (Computational) Story of M_{Ch} SNIa

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Abstract (2,250 Maximum Characters): A diversity of models of SNIa have been presented in the literature, but all agree --- in one form or another --- that the event involves a thermonuclear explosion on or in the vicinity of a C/O white dwarf. Whether this explosion occurs as a deflagration, detonation, or both is somewhat of an open question, but all models ultimately must obtain the proper nucleosynthetic yields to reproduce the observed lightcurve and spectra. I describe some of the efforts of our group over the last few years involving the single degenerate, Chandrasekhar model. In particular, I describe our low Mach number MAESTRO simulations of the core convection and simmering that leads up to an off-center ignition. I also discuss how we have mapped these low Mach number results into our compressible hydrodynamics code, CASTRO, with a thickened flame model to evolve the ignition spot as it buoyantly rises toward the stellar surface. Upon breaking through the surface, the deflagration may transition to a detonation in regions of large shear or compression. The resulting explosion can then be put into a radiation hydrodynamic/transfer code to obtain synthetic spectra.