physical conditions (e.g., temperature-pressure profile, evaporation, presence of clouds and hazes, and winds). I present multi-wavelength ground and space-based observation programs to characterize planetary systems transiting nearby stars through the observation of their atmospheres. These observations are the only effective way at present to address the composition of exoplanets quantitatively, which is critical when understanding their formation, evolution and nature. I also discuss these observational advances in the context of new opportunities offered by the discovery of transiting giant planets detected by the Kepler Space Telescope.

126.08 – The State Of The Art For Ground-Based Transit Spectroscopy

J. Bean, K.B. Stevenson, A. Seifahrt, University of Chicago, Chicago, IL; J. Desert, Caltech, Pasadena, CA; N. Madhusudhan, Yale, New Haven, CT

03:20 PM-03:30 PM

Transit spectroscopy using multi-object spectrographs with wide slits has recently emerged as a powerful way to investigate exoplanet atmospheres. I will present new results from the application of this technique, with an emphasis on trying to determine the composition, chemistry, and conditions in hot-Jupiter atmospheres and what technical challenges remain. Case study targets include the potentially carbon-rich planet Wasp-12b, for which we have obtained transmission data in the red optical, and the super-hot planet Wasp-19b, for which we have obtained near-infrared transmission and emission data.

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127 – Family Leave Policies and Childcare for Graduate Students and Postdocs

Special Session – Room 201B (Long Beach Convention Center) – 07 Jan 2013 02:00 PM to 03:30 PM

This special session will provide a forum in which individuals in positions to influence policy (including university faculty and department chairs, and program directors from funding agencies) and those who may directly benefit from such policies (graduate students and postdocs) can discuss the current practices regarding parental leave and childcare for graduate students and postdoctoral fellows, and the means by which departments and funding agencies can establish more supportive policies. The session will begin with the results from the recent national survey of graduate student parental leave policies in US departments of astronomy and astrophysics. We will then hear from a department chair and graduate student who together implemented a departmental paid leave policy. Additional speakers include program directors from NSF and NASA, as well as the AAS President David Helfand. Attend this session to learn about the recent changes in many university departments nationwide, and to ask questions that inform any policy changes you are considering in your own workplace.

127.01 – A National Survey of Parental Leave and Childcare Policies for Graduate Students in Departments of Astronomy

D. Charbonneau, Harvard Univ., Cambridge, MA

02:00 PM-02:10 PM

The AAS Committee on the Status of Women in Astronomy conducted a national survey to determine current policies regarding parental leave and childcare for graduate student parents. We sent a letter to the Chair of each U.S. department of astronomy and/or astrophysics that offers the PhD degree. The letter inquired both about leave following the birth or adoption of a child (including questions about eligibility, whether the leave was paid or unpaid, and whether benefits including health care and housing were retained during leave), as well as childcare (including questions about eligibility, access, and financial assistance). The letter sought to determine the official departmental policies, but also inquired about any unofficial policies. We also inquired as to mechanisms to cover costs associated with both parental leave and childcare, and the means by which graduate students were informed about the policies. The response rate was 100%. We will present the results at this special session, and then lead a discussion of the changing landscape of parental leave for graduate students in our field.

127.02 – Implementing a Paid Leave Policy for Graduate Students at UW - Madison: The Student Perspective

N.M. Gosnell, University of Wisconsin-Madison, Madison, WI

02:10 PM-02:18 PM

In 2010 the University of Wisconsin - Madison Astronomy Department developed and implemented a departmental paid leave policy for our graduate students, even though the university lacks a campus-wide policy and cannot provide institutional funding for such programs. This policy includes 12 weeks of paid leave in event of a medical emergency or chronic medical condition, as well as paid parental leave for both male and female graduate research assistants. (The policy in its entirety can be found at http://www.astro.wisc.edu/grad-students/policies-procedures/medical-and-family-leave-policy.) This is the first of two presentations describing our policy implementation using a 'bottom-up' approach, beginning with the graduate students. I will present the perspective of the graduate students who led the effort and will discuss the steps we took to put our policy in place, from the conception of the plan to the full implementation. These steps included identifying faculty allies, becoming knowledgeable about university policies and resources, involving department staff, and anticipating procedural and bureaucratic hurdles in order to come up with creative solutions in advance. Although each individual institution and department's path to implementing a similar plan will be unique, we hope the methods used to implement our policy at UW - Madison may serve as an example.

127.03 – Implementing a Paid Leave Policy for Graduate Students at UW-Madison: The Department Chair Perspective

R.D. Mathieu, Univ. of Wisconsin, Madison, WI

02:18 PM-02:25 PM

In 2010 the University of Wisconsin - Madison Astronomy Department developed and implemented a departmental paid leave policy for our graduate students, even though the university lacks a campus-wide policy and cannot provide institutional funding for such programs. This policy includes 12 weeks of paid leave in event of a medical emergency or chronic medical condition, as well as paid parental leave for both male and female graduate research assistants. Building on the graduate student perspective of Gosnell (2012), I will discuss the process of this successful development of a departmental family and medical leave policy for graduate students from the perspective of a faculty member and chair. In particular I will discuss implications of university policies, the importance of faculty and staff support, the role of private funds, and issues of effort certification.

127.04 – NSF's Career-Life Balance Initiative and the NSF Astronomy and Astrophysics Postdoctoral Fellowships

E.A. Ajhar, National Science Foundation, Arlington, VA; E.A. Ajhar, St. Thomas University, Miami Gardens, FL

02:25 PM-02:40 PM

In the fall of 2011, the National Science Foundation (NSF) began the Career-Life Balance Initiative to support graduate students, postdoctoral students, and early-career researchers in STEM fields. NSF is focusing first on its most prestigious programs for early-career scientists---the CAREER program and the postdoctoral programs, including the NSF Astronomy and Astrophysics Postdoctoral Fellowships (AAPF)---where career–life balance opportunities can help retain a significant fraction of early career talent. Subject to budget constraints, NSF plans to further integrate and enhance career–life balance opportunities over time through other programs, like the Graduate Research Fellowships Program and ADVANCE, and subsequently through the broader portfolio of NSF activities. In addition, to comply with Title IX, NSF has regulations to ensure that educational programs that receive NSF funds are free of gender discrimination and harassment. A primary goal of this presentation is to put facts about NSF into the hands of students, faculty, staff, administrators and other policy makers to benefit the advancement of career-life balance in the astronomical community. The presentation focus areas will (1) address common misconceptions about NSF rules regarding parental leave; (2) discuss benefits already available through the AAPF program, Graduate Research Fellowships, and other programs; and (3) listen to community concerns and issues to bring these back to the foundation for consideration. Did you know that NSF allows paid parental leave under many circumstances? For example, the AAPF program currently allows two months of paid parental leave during the fellow's tenure. What are the rules for NSF Graduate Research Fellowships? Come to the session and find out; the answers to such questions might surprise you.

127.05 – NASA's Postdoctoral Fellowship Programs

C.A. Beichman, D.M. Gelino, JPL, Pasadena, CA; R.J. Allen, STScI, Baltimore, MD; A.H. Prestwich, CfA, Cambridge, MA

02:40 PM-02:55 PM

The three named fellowships --- the Einstein, Hubble and Sagan programs --- are among the most prestigious postdoctoral positions in astronomy. Their policies are closely coordinated to ensure the highest scientific quality, the broadest possible access to a diverse community of recent PhD graduates, and flexibility in completing the 3 year appointments in light of individual personal circumstances. We will discuss practical details related to 'family-friendly' best practices such as no-cost extensions and the ability to transfer the host institution in response to 'two body problems.' We note, however, that the terms of the NASA fellowships are such that fellows become employees of their host institutions which set specific policies on issues such as parental

leave. We look forward to participating in the discussion at this special session and conveying to NASA any suggestions for improving the fellowship program.

127.06 – Confronting Barriers, Creating Solutions: Parental Leave for Junior Colleagues

D.J. Helfand, AAS, Squamish, British Columbia, CANADA

02:55 PM-03:10 PM

Barriers to instituting parental leave policies for graduate students and postdoctoral fellows are present at the departmental, university/institute, and federal levels. Within departments, collegial persuasion involving both those affected and senior leadership can be successful in overcoming sociological resistance, although financial constraints may be harder to surmount. Universities are constrained by internal policies and the structure of their fringe benefits pools which are in turn limited by reimbursement rates that must be negotiated with their federal oversight agencies. Federal effort-reporting rules also complicate the situation. I will describe the type of creative solutions that can work at the departmental level, as well as discussing the actions the Society is pursuing in an attempt to lower the external barriers to local action.

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128 – Galaxy Clusters II

Oral Session – Room 103A (Long Beach Convention Center) – 07 Jan 2013 02:00 PM to 03:30 PM

128.01 – MHD Cosmological Simulations of Radio Relics in Galaxy Clusters and Implications for Observations

J.O. Burns, S.W. Skillman, E. Hallman, Univ. of Colorado at Boulder, Boulder, CO; H. Xu, H. Li, D.C. Collins, Los Alamos National Laboratory, Los Alamos, NM; B.W. O'Shea, Michigan State University, East Lansing, MI; M.L. Norman, University of California at San Diego, La Jolla, CA

02:00 PM-02:10 PM

Non-thermal radio emission from cosmic ray electrons in the vicinity of merging galaxy clusters is an important tracer of cluster merger activity, and is the result of complex physical processes that involve magnetic fields, particle acceleration, gas dynamics, and radiation. In particular, radio relics are thought to be the result of shock-accelerated electrons that, when embedded in a magnetic field, emit synchrotron radiation at radio wavelengths. In order to properly model this emission, we utilize adaptive mesh refinement simulations of the magnetohydrodynamic evolution of galaxy clusters from cosmological initial conditions. We locate shock fronts and apply models of cosmic ray electron acceleration that are then input into radio emission models. We have determined the thermodynamic properties of this radio-emitting plasma and constructed synthetic radio observations to compare to observed galaxy clusters. We find a significant dependence of the observed morphology and radio relic properties on the viewing angle of the cluster, raising concerns regarding the interpretation of observed radio features in clusters. We also find that a given shock should not be characterized by a single Mach number. We find that the bulk of the radio emission comes from gas with T > 5 keV, magnetic field strengths of 0.01-0.1 μG, and shock Mach numbers of M~3-5. We present an analysis of the radio spectral index which suggests that the spatial variation of the spectral index can mimic synchrotron aging. Finally, we examine the polarization fraction and position angle of the simulated radio features, and compare to observations.

128.02D – Adaptive Mesh Refinement Simulations of Cosmic Rays in Clusters of Galaxies

S.W. Skillman, University of Colorado, Boulder, Boulder, CO

02:10 PM-02:30 PM

Galaxy clusters are unique astrophysical laboratories that contain many thermal and non-thermal phenomena. In particular, they are hosts to cosmic shocks, which propagate through the intracluster medium as a signature of structure formation. It is believed that at these shock fronts, magnetic field inhomogeneities in a compressing flow may lead to the acceleration of cosmic ray electrons and ions. These relativistic particles decay and radiate through a variety of mechanisms, and have observational signatures in radio, hard X-ray, and Gamma-ray wavelengths. Modelling these dynamics require a combination of cosmological hydrodynamics coupled with a model to follow the momentum-space distribution of cosmic ray electrons and protons. I will present our work combining Enzo (enzo-project.org), an Adaptive Mesh Refinement hydrodynamics + N-body particle-mesh gravity solver, with CRT, a numerical library for cosmic ray transport. I then use these simulations, together with synthetic observation tools written within the yt (yt-project.org) framework, to produce simulated radio, X-ray, Gamma-ray, and thermal Sunyaev-Zel'dovich Effect observations. I highlight their relationships with each other as well as the underlying fluid quantities.

128.03D – Suzaku Observations of the X-ray Brightest Galaxy ESO3060170

Y. Su, R.E. White, J. Irwin, Univ. of Alabama, Tuscaloosa, AL; E.D. Miller, MIT, Cambridge , MA

02:30 PM-02:50 PM

In the hierarchical Universe, groups are regarded as the building blocks of clusters of galaxies. Yet groups differ from clusters in their baryon fractions, iron mass-to-light ratios, and various global scaling relations. Fossil galaxy groups, each dominated by a relatively isolated giant elliptical galaxy, have many properties intermediate between regular groups and clusters of galaxies. We observed the X-ray brightest fossil group ESO3060170 out to its virial radius, with the Suzaku X-ray Observatory, in order to better elucidate the relation between fossil groups, normal groups, and clusters. We find that the gaseous entropy and pressure profiles in the outer regions are flatter than found in numerically simulated clusters. This may indicate that the gas is clumpy, as found in some massive clusters, and/or the gas has been redistributed outwards.

128.04 – The Cluster Lensing And Supernova survey with Hubble (CLASH): Mass Distributions in and Around Relaxed vs. Merging Clusters

E. Medezinski, Johns Hopkins University, Baltimore, MD; K. Umetsu, ASIAA, Taipei, TAIWAN; J. Merten, JPL, Pasadena, CA

02:50 PM-03:00 PM

The Cluster Lensing And Supernova survey with Hubble (CLASH) is a 524-orbit multi-cycle treasury program to observe 25 galaxy clusters each in 16 broadband filters with WFC3 and ACS. One of the most important drivers of this program is to accurately map the mass distributions of these clusters and to interpret their cosmological implications. Gravitational lensing provides a direct probe of the total mass, regardless of its physical state or composition. A combination of strong lensing (SL) analysis in cluster centers, with weak lensing (WL) analysis that trace the cluster mass out to the virial radius, is required in order to measure cluster mass and its distribution on all scales. Our wide-field analysis of CLASH clusters utilizes complementary multi-band ground-based Subaru/Suprime-Cam photometry, ideal for WL measurements. I present 1D/2D lensing mass reconstructions to beyond the virial radius of two massive clusters of galaxies: MACSJ1206, a relaxed cluster, and MACSJ0717, a complex merging cluster. I discuss the differences in approach required to analyze clusters in different relaxation states.

128.05D – The Bolocam SZ Program: Model-Independent Cluster Profiles and Y-Mgas Scaling Relations

N.G. Czakon, J. Sayers, S.R. Golwala, T.P. Downes, S. Siegel, California Institute of Technology, Pasadena, CA; A. Mantz, Kavli Institute for Cosmological Physics, University of Chicago, Chicago, IL; E. Pierpaoli, J. Shitanishi, University of Southern California, Los Angeles, CA; P.M. Koch, K. Lin, S. Molnar, K. Umetsu, Institute of Astronomy and Astrophysics, Academica Sinica, Taipai, TAIWAN

03:00 PM-03:20 PM

Bolocam has observed more than 45 galaxy clusters at 143 GHz--including all 25 clusters in the CLASH HST strong lensing survey and all 12 clusters in the MACS high redshift sample. Typical map coverage goes out to 14 arcmins in diameter with a 58 arcsec resolution and a median RMS of 22 uK-arcmin. Resolved, high-S/N SZ images provide unique insight into the physics of the outer ICM and we have generated scaling relations between the integrated Compton y-parameter and X-ray derived gas mass measurements. To characterize selection biases in our fits we model the cluster population with a Tinker mass function and refit the data with various selection scenarios. Although our maps have coverage beyond r500 for most clusters, we find that integrating the signal within r2500 produces a tighter relation with reduced measurement uncertainty. We account for differences in our X-ray mass model and find our Ysz scaling relations to be consistent with those predicted from the X-ray scaling relations.

128.06 – Constraints on the Stellar Mass Growth of Brightest Cluster Galaxies

Y. Lin, Institute of Astronomy and Astrophysics, Academia Sinica, Taipei, TAIWAN; M. Brodwin, University of Missouri, Kansas City, Kansas City, MO; A.H. Gonzalez, University of Florida, Gainesville, FL; S.A. Stanford, UC Davis, Davis, CA; P.R. Eisenhardt, JPL, Pasadena, CA; P.W. Bode, J.P. Ostriker, Princeton University, Princeton, NJ

03:20 PM-03:30 PM

The details of the stellar mass assembly of brightest cluster galaxies (BCGs) remain one of much debated topics in galaxy formation. We have developed a novel approach that allows us to construct a sample of clusters that form an evolutionary sequence, and have applied it to the IRAC Shallow Cluster Survey to examine the evolution of BCGs in progenitors of present-day clusters with mass of (3-4)x10^{14}Msun. After developing a method that infers the cluster mass based on the ranking of cluster luminosity, we make use of detailed cluster mass growth history extracted from high resolution