S1.00019 Quasar Additional Intrinsic Redshift Mechanism?? , C.F. GALLO , Superconix Inc — From observations and spectral peculiarities, Quasars have complex "intrinsic" redshift(s) added to Hubble redshift. Different Quasars have variable surrounding cloud of plasma and gases (atomic and molecular). Variable local redshifting ensues from photon energy-loss interactions with surrounding cloud. Two Quasar anomalies are examined. (1) The H:21cm redshift is small compared to larger redshift of higher energy photons, possibly due to Raman redshift since low energy H:21cm photons have INsufficient energy to excite redshifting Raman levels. (2) The hydrogen Balmer lines show an additionally redshifted (∼1000km/s) broadened component, possibly due to Raman hyperfine redshift via hydrogen nuclear spin. This extra H:Balmer-type component is NOT present in CIV and MgII lines which have NO nuclear spin. NOTE: Any Raman energy-loss mechanism will effectively redshift the original line, but effectiveness will decrease as line progressively redshifts away from initial value, becoming ineffective with saturated redshift value. This ensues since photon Raman cross-section decreases as initial line redshifts off resonance, with cross- section eventually becoming negligible, consistent with Quasar data.

S1.00020 Observation of the High-Energy Peaked BL Lac Object 1ES 1218+304 with STACEE[1] , NAUREEN AKHTER, Barnard College, Columbia University, J. BALL, UCLA; Current address: Gemini Observatory, J.E. CARSON, UCLA; Current address: SLAC, C.E. COVAULT, CWRU, D.D. DRISCOLL, CWRU; Current address: Kent State Univ., P. FORTIN, Barnard College, Columbia University, D.M. GINGRICH, U. of Alberta & TRIUMF, Canada, D.S. HANNA, McGill Univ., Canada, A. JARVIS, UCLA, J. KILDEA, McGill University; Current address: FLWO, T. LINDNER, McGill University; Current address: Univ. of British Columbia, Canada, C. MUELLER, McGill University, Canada, R. MUKHERJEE, Barnard College, Columbia University, R.A. ONG, UCLA, K. RAGAN, McGill University, Canada, D.A. WILLIAMS, SCIPP, J. ZWEERINK, UCLA, STACEE COLLABORATION COLLABORATION — We present the analysis of recent high-energy gamma-ray observations of the BL Lac object 1ES 1218+304 with the Solar Tower Atmospheric Cherenkov Effect Experiment (STACEE). 1ES 1218+304 is an X-ray bright high-energy peaked BL Lac (HBL) that is also a source of TeV gamma rays, and has recently been detected by the atmospheric Cherenkov telescopes MAGIC and VERITAS. We will present results from STACEE observations of 1ES 1218+304 in the 2006 and 2007 observing seasons.

[1]N. A. & R. M. acknowledge support from NSF grant PHY-0601112.

S1.00021 Thermo−Rotational Instability in Plasma Disks Around Compact Objects∗ , BRUNO COPPI, M.I.T. — Differentially rotating plasma disks, around compact objects, that are imbedded in a "seed" magnetic field are shown to develop vertically localized ballooning modes that are driven by the combined radial gradient of the rotation frequency and the vertical gradients of the plasma density and temperature [1]. When the electron mean free path is shorter than the disk height and the (vertical) thermal conductivity can be neglected, the vertical particle flows produced by of these modes have the effect to drive the density and temperature profiles toward the "adiabatic condition" where $\eta_T \equiv (dlnT/dz/(dlnn/dz) = 2/3$. Here T is the plasma temperature and n the particle density. The faster growth rates correspond to steeper temperature profiles ($\eta_T > 2/3$) such as those produced by an internal (e.g. viscous) heating process. In the end, ballooning modes excited for various values of η_T can lead to the evolution of the disk into a different current carrying configuration such as a sequence of plasma rings[2].
∗Sponsored in part by the U.S. Department of Energy
[1]B. Coppi, M.I.T. (LNS) Report HEP, 07/02, Cambridge, MA (2007), *Invited Paper at the International Symposium on "Momentum Transport in Jets, Disks and Laboratory Plasmas", Alba, Piedmont, September 2007*, to be published in Europhysical Letters (EPL, IOP)
[2]B. Coppi andF. Rousseau, *Ap. J.*, **641**, 458, (2006)

S1.00022 A High Frequency Search for Gravitational Wave Bursts , BRENNAN HUGHEY, MIT, LIGO SCIENTIFIC COLLABORATION — We present a first look at an all-sky gravitational wave burst search in the frequency range 1 to 6.5 kHz using LIGO data. Previous burst searches with ground-based interferometers have been limited to frequencies below 2 kHz. However, various models predict gravitational wave emission in the several kiloHertz range from astrophysical phenomena including gravitational collapse, neutron star modes and low mass black hole mergers. This shot-noise dominated frequency regime can be analyzed with the same tools as lower frequency analyses.

S1.00023 Reheating of the universe after inflation with f(phi)R gravity[1] , YUKI WATANABE, EIICHIRO KOMATSU, Univ. of Texas, Austin — We show that reheating of the universe occurs spontaneously in a broad class of inflation models with $f(\phi)R$ gravity (ϕ is inflaton). The model does not require explicit couplings between ϕ and bosonic or fermionic matter fields. The couplings arise spontaneously when ϕ settles in the vacuum expectation value (vev) and oscillates, with coupling constants given by derivatives of $f(\phi)$ at the vev and the mass of resulting bosonic or fermionic fields. This mechanism allows inflaton quanta to decay into any fields which are not conformally invariant in $f(\phi)R$ gravity theories.

[1]This work is supported by Alfred P. Sloan Foundation.

S1.00024 Projectile acceleration to a velocity over the Earth's escape velocity and application in planetary science. , T. KADONO, K. SHIGEMORI, S. FUJIOKA, K. OTANI, T. SANO, A. SHIROSHITA, Y. HIRONAKA, Y. SAKAWA, ILE, Osaka university, N. OZAKI, T. KIMURA, K. MIYANISHI, T. ENDO, Graduate School of Engineering, Osaka university, M. ARAKAWA, Nagoya University, A. NAKAMURA, Kobe University, S. SUGITA, T. MATSUI, University of Tokyo — Impact velocity of meteorites on Earth at the final stage of planetary accretion becomes more than 10 km/s. However, macroscopic (larger than 0.1 mm) projectiles are not easily accelerated to more than 10 km/s by two-stage light-gas guns. One possible method to a velocity larger than 10 km/s is the irradiation of high-intensity lasers. Here, we describe the first results of projectile (glass spheres) acceleration experiments to a velocity higher than 10 km/s using GEKKO XII laser at Institute of Laser Engineering. Glass spheres are accelerated to a velocity of 15 km/s. This is enough to simulate hypervelocity impacts on the surface of the proto-planets and investigate various phenomena caused by the impacts such as impact vaporization of silicate rocks, crater formation on rocks, and metamorphism due to high pressure.

S1.00025 Limits on Relativistic Magnetic Monopole Flux from RICE , DANIEL HOGAN, University of Kansas, RICE COLLABORATION — The Radio Ice Cherenkov Experiment (RICE) is a radio antenna array at the South Pole. A Monte Carlo simulation of magnetic monopole propagation through polar ice is used to determine RICE's cross-section for monopole detection. We present final results for ultrarelativistic ($\gamma \geq 10^7$) magnetic monopole flux upper bounds based on RICE observations from 2001 through 2005. This limit is the strongest direct measurement of ultrarelativistic monopole flux.