Astrophysics

Thursday, 03.09.2015, Room EI 10

Time	ID	**ASTROPHYSICS** *Chair: Manuel Güdel, Uni Wien*
12:30 - 14:30		***ÖGAA General Assembly***
15:00	**901**	**BRITE-Constellation: Five nanosatellites for astrophysics** *Werner Weiss, Institut für Astrophysik, Universität Wien, Türkenschanzstrasse 17, AT-1180 Wien* BRITE-Constellation focusses on studies of luminous stars (both massive and moderately massive but evolved) in the solar neighborhood, representing objects which dominate the ecology of our Universe. Massive stars explode as Supernovae and enrich the Interstellar Medium with heavy elements, but also evolved low-mass stars (giants) contribute to the ISM by ejecting planetary nebulae at the end of their lives. Their individual modesty is compensated for by their large numbers. Primary science goals are: -Stars in clusters and associations, -Stellar surface inhomogeneities (spots) and their temporal evolution, -Granulation signatures in the HRD, -Planet detection, -"Constant" stars, valuable as photometric standards.
15:20	**902**	**The Cherenkov Telescope Array single-mirror small size telescope project: status and prospects** *Asen Christov, Teresa Montaruli, Domenico della Volpe, Matthieu Heller, Enrico Junior Schioppa, Mohamed Rameez, Alessio Porcelli, Isaac Troyano Pujadas* *DPNC, Université de Genève, 24, Quai Ernest-Ansermet, CH-1211 Genève* The Cherenkov Telescope Array (CTA), the next generation very high energy gamma-ray observatory, will consist of three types of telescopes: large (LST), medium (MST) and small (SST) size telescopes. The small size telescopes are dedicated to the observation of gamma-rays with energy between a few TeV and few hundreds of TeV. The single-mirror small size telescope (SST-1M) is one of the proposed SST designs. It will be equipped with a 4 m-diameter segmented mirror dish and a fully digital camera based on SiPM. The telescope structure is ready and in 2015 it will be completed with mirror facets and camera.
15:40	**903**	**FACT - Status and Experience** *Gareth Hughes, IPP, ETH Zürich, Otto-Stern Weg 5, CH-8093 Zürich* The First G-APD Cherenkov Telescope (FACT) is pioneering the usage of solid state photosensors (G-APD/SiPM). Physics data-taking started in October 2011. FACT operates remotely and over three years G-APDs have proven to be very reliable. Despite operating them regularly also under strong moonlight conditions, the G-APDs show no change in their properties or any indication for aging. This allows FACT to monitoring the brightest TeV blazars and several flare-alerts per year have been sent to the community. This presentation will describe the status of FACT and report the lessons learned regarding the usage of SiPM in Cherenkov telescopes.

16:00	**904**	**An Excess of Dusty Starbursts at z=2.2** *Helmut Dannerbauer, Institut für Astrophysik, Universität Wien, Türkenschanzstr. 17, AT-1180 Vienna* Searching for massive, dusty starbursts offers the great opportunity to trace galaxy overdensities and thus the cosmic web in the distant universe. I will present our APEX-LABOCA 870micron imaging of the protocluster field of the radio galaxy MRC1138-262 - the so-called Spiderweb Galaxy - at z=2.16, uncovering a large number of so-called submm galaxies (SMGs). The number counts already indicate an excess of SMGs compared to blank fields. Based on an exquisite multi-wavelength dataset (including Herschel, VLA, Spitzer, HST, VLT, ATCA), I will show that a large fraction of these massive, dusty starbursts are physically associated with the proto-cluster at z=2.16. Finally, I will discuss both the properties of this starburstoverdensity and their individual members.
16:20		
16:30		***Coffee Break***
		Chair: Helmut Dannerbauer, Uni Wien
17:00	**905**	**Correlation between the UHECRs measured by the Pierre Auger Observatory and Telescope Array and neutrino candidate events from IceCube** *Asen Christov [1], Teresa Montaruli [1], Mohamed Rameez [1], Geraldina Golup [2]* *[1] DPNC, Université de Genève, 24, Quai Ernest-Ansermet, CH-1211 Genève* *[2] Laboratorio de Detección de Partículas y Radiación,Centro Atómico Bariloche, Av. Bustillo 9500, AR-8400 San Carlos de Bariloche* We present the searches for correlations between UHECR events measured by Telescope Array and Pierre Auger Observatory and high-energy neutrino events from IceCube. Two cross-correlation analyses of UHECRs: one with 28 cascades from the IceCube high-energy starting events sample and the other with 12 high-energy tracks. The angular separation between the neutrinos and UHECRs is scanned. The same events are used in a search stacking the neutrino directions and using a maximum likelihood approach. An analysis is performed on stacked UHECR arrival directions and the IceCube 4-year sample of muon-track events that was optimized for neutrino point source searches.
17:20	**906**	**The early evolution of (sub-)solar-mass protostars** *Eduard Vorobyov, Dep. of Astrophysics, University of Vienna, Türkenschanzstr. 17, AT-1180 Vienna* The early evolution of protostars is not well understood. Simple analytic collapse models of non-rotating cores fail when confronted with available observations of young star-forming regions. More elaborated numerical hydrodynamics simulations of rotating cores demonstrate that most of the initial core material lands onto a circumstellar disk formed thanks to the conservation of angular momentum. The physical processes of mass and angular momentum transport that develop in the disk often lead to a very complicated, time-varying pattern of mass accretion onto the star. This talk is aimed at reviewing the current progress in our understanding of the early stages of star formation.
17:40	**907**	**Near-infrared molecular hydrogen emission in protoplanetary disks: a high resolution spectroscopy study.** *Carla Baldovin Saavedra [1], Andres Carmona [2], Marc Audard [3], Manuel Güdel [1]* *[1] Department of Astrophysics, University of Vienna, Türkenschanzstrasse 17, AT-1180 Vienna* *[2] Konkoly Observatory, Konkoly Thege Miklós út 15-17, HU-1121 Budapest* *[3] Department of Astronomy, University of Geneva, Chemin d'Ecogia 16, CH-1290 Versoix* Protoplanetary disks evolve and disperse, their evolution is tightly linked to the planet formation process; the amount of gas present in the inner disk and the timescales for disk dissipation are major constraints for planet formation. A possible mechanisms for disk dispersal is a pressure-driven wind produced by stellar high-energy emission. We present direct evidence of such winds in molecular hydrogen observed in the near-infrared with CRIRES (VLT). We compare the properties of the molecular wind with previous detections of atomic species in the optical and mid-infrared, and discuss our results in the context of different wind models.

18:00	**908**	**The impact of X-ray radiation and stellar cosmic rays on the chemical structure of protoplanetary disks around T Tauri stars.** *Christian Rab [1], Manuel Güdel [1], Marco Padovani [2], Inga Kamp [3], Wing-Fai Thi [4], Peter Woitke [5]* *[1] Department of Astrophysics, University of Vienna, Türkenschanzstraße 17, AT-1180 Vienna* *[2] Laboratoire Univers et Particules de Montpellier, Université de Montpellier, place E. Bataillon, FR-34095 Montpellier* *[3] Kapteyn Astronomical Institute, University of Groningen, P.O. Box 800, NL-9700 AV Groningen* *[4] Max-Planck-Institut für extraterrestrische Physik, Giessenbachstrasse 1, DE-85748 Garching* *[5] SUPA, School of Physics & Astronomy, University of St. Andrews, North Haugh, St. Andrews KY16 9SS, UK* Protoplanetary disks around young stars are the natural outcome of low mass star formation. Compared to the Sun, these young stars show strong X-ray emission and therefore possibly also enhanced production of stellar high energy particles (stellar cosmic rays, STCR). We have implemented a detailed treatment of X-ray and STCR transport in the protoplanetary disk modelling code ProDiMo to investigate the impact of X-rays and STCR on the ionization fraction of the disk. We discuss possible observational tracers of these high energy processes by means of synthetic ALMA images of molecular ion emission (e.g. HCO^+ and N_2H^+).
18:20	**909**	**The metamorphoses of Fe and the illusive FeO** *Odysseas Dionatos, Institut für Astrophysik, Universität Wien, Türkenschanzstraße 17, AT-1180 Wien* The non-detection of FeO in the interstellar medium remains a long standing enigma. Both Fe and O have high cosmic abundances, and FeO has been expected to form in diverse environments such as the atmospheres of M-stars, photon-dominated regions and shocks. Until today, there has been only a single case claiming the detection of FeO. We present recent ALMA observations aiming to detect FeO in regions of dense, shocked gas within the envelope of the embedded protostars. Such observations can provide direct links to the FeO concentrations found in meteorites of our own solar system, and give information on the early processing of solids.
18:40		***END***
19:45		***Public Lecture***

ID	**Astrophysics Poster**
921	**The radiation of M-stars and their impact on phototrophic organisms** *Nicole Zibrid [1], Wolfgang Ludwig [2], Johannes Leitner [3], Ruth-Sophie Taubner [4], Marie G. Firneis [4], Regina Hitzenberger [2]* *[1] Institute of Astrophysics, University of Vienna, Türkenschanzstraße 17, AT-1180 Vienna* *[2] Faculty of Physics, University of Vienna, Strudlhofgasse 4, AT-1090 Vienna* *[3] SCI.E.S.COM, Hernstein, AT-2560 Hernstein* *[4] Research Platform on ExoLife, Türkenschanzstraße 17, AT-1180 Vienna* M-stars, the most abundant spectral class in our galaxy (Segura, 2005), possess low luminosity. Thus in the habitable region, the planets' orbits are very close to their central star (Scalo, 2007). The spectral energy distribution of the planet's surface, necessary to determine whether photosynthesis can be performed (Weiler, 2008), was calculated using the radiative transfer model Streamer assuming different atmospheres with diverse compositions. It was then compared to the action spectrum of the chlorophyll molecules with absorption maxima located in the optical blue and optical red region, allowing to make a statement about the possibility of photosynthesis.