

[ Room/Salle : Colbourne ]

Chair: D. Scott, UBC

WE-P13-1 16h00

HENK HOEKSTRA, CITA

*Astrophysical Evidence For Dark Matter*

The evidence for dark matter as a significant constituent of the universe based on astronomical observations has been compelling for a long time. Observations of the rotation curves of galaxies and the motion of galaxies and gas in clusters of galaxies provided the first clues about dark matter. More recent probes such as weak gravitational lensing have significantly improved our knowledge about the amount and distribution of dark matter. In this talk I will review the observational evidence for dark matter based on the variety of probes mentioned above, focusing on the most recent developments. I will also demonstrate how new observations are incompatible with alternative theories of gravity, which have been proposed to explain the observations without the need of dark matter.

WE-P13-2 16h30

UBI WICHOSKI, Groupe de Physique des Particule - Université de Montréal

*Status of the Dark Matter Search*

Our present understanding of the Universe, based on the most recent observations, is that approximately 70% of its energy density is in the form of dark energy and the remaining 30% in the form of gravitating matter. According to the big-bang model of cosmology, only approximately 15% of the gravitating matter in the Universe can be made of baryons. This leads to the conclusion that 85% of the matter content of the Universe is made of non-baryonic and, in the sense that it does not emit nor absorb electromagnetic radiation, dark matter. The first suggestion for the existence of dark matter appeared more than 70 years ago to explain the rotation curves of the spiral galaxies. Nowadays, dark matter is expected to exist in scales ranging from galactic to cosmological. On the theoretical side, there is a profusion of dark matter candidates, the majority coming from extensions of the standard model of particle physics. There is also a wealth of experiments searching for dark matter both directly and indirectly. In this talk we will give an overview and discuss future perspectives in the light of recent developments.

WE-P13-3 17h00

Weak Lensing by Galaxy Groups at Intermediate Redshift\*, **Laura Parker**, *University of Waterloo* — I intend to present the results from our weak lensing survey of CNOC2 galaxy groups. The detected shear is used to calculate the M/L of these groups and constrain the matter density of the universe. The measured tangential shear is also of sufficient S/N that it allows us, for the first time, to constrain the DM profile of galaxy groups.

\* This work is being supported by NSERC, ORDCF.

WE-P13-4 17h15

Results From LIGO's Second Science Run: A Search For Continuous Gravitational Waves\*, **Michael Landry** for the LIGO Scientific Collaboration, *LIGO Hanford Observatory/Caltech* — The Laser Interferometer Gravitational Wave Observatory (LIGO) was operated from Feb 14 - Apr 14 2003, comprising the second science run for the project. These data have been analyzed for evidence of gravitational waves emitted by several classes of potential sources, including continuous wave sources such as spinning neutron stars. A brief overview of the interferometers and detection scheme is presented, followed by a discussion of the methodology and results of the search for continuous gravitational waves. Plans for future analyses are outlined.

\* This work is being supported by National Science Foundation.

17h30 Session Ends / Fin de la session

pulsar itself. We discuss the spectrum and morphology of this new pulsar wind nebula and compare it to others. Chandra timing observations show possible X-ray pulsations from the point source at the rotational period predicted by radio timing observations. The point-source emission is most likely thermal, from the neutron-star surface.

16h30 Session Ends / Fin de la session

**[WE-P15] Miscellaneous Intrigues - Contributed /  
Intrigues diverses - contribuées**

(CASCA)

**WEDNESDAY, JUNE 16  
MERCREDI, 16 JUIN  
16h30 - 17h15**

[ Room/Salle : Campaign B ]

Chair: D. Hanes, Queen's U.

**WE-P15-1 16h30**

**The Initial-Final Mass Relationship\***, Jasonjot Kalirai<sup>1</sup>, H. Richer<sup>1</sup>, P. Bergeron<sup>2</sup>, G. Fahlman<sup>3</sup>, B. Gibson<sup>4</sup>, B. Hansen<sup>5</sup>, T. von Hippel<sup>6,1</sup> *University of British Columbia*, <sup>2</sup> Université de Montréal, <sup>3</sup> HIA/NRC, <sup>4</sup> Swinburne, <sup>5</sup> UCLA and <sup>6</sup> University of Texas — The initial-final mass relationship relates the mass of a white dwarf star to its main sequence progenitor mass. The relationship, despite being poorly constrained, is widely used as input in several important astrophysical areas. These include determining the upper mass limit to white dwarf production, constraining the rates of type II SNe, better understanding star formation rates, determining the chemical enrichment of the ISM, and constraining the birth rates of neutron stars. We will discuss first results from a new program at Gemini to investigate the white dwarf initial-final mass relationship. Preliminary analysis of multi-object spectroscopic observations of very faint candidate white dwarfs in the rich, well studied, open star cluster NGC 2099 will be presented.

\* This work is being supported by NSERC.

**WE-P15-2 16h45**

**Simulating Spitzer 3-24Micron Colour-Colour Diagrams Including Redshift Evolution**, Anna Sajina<sup>1</sup>, M.D. Lacy<sup>2</sup> and D. Scott<sup>1</sup>, <sup>1</sup>University of British Columbia and <sup>2</sup>Spitzer Science Center — We use a simple parametrization of the mid-IR spectra of a wide range of galaxy types in order to predict their distribution in IRAC/MIPS colour-colour diagrams. In particular, we discuss three basic types by the energetically dominant component in the 3-12micron regime: stellar-dominated, PAH-dominated, and continuum-dominated all spread over the range  $z \sim 0-1.5$ . This allows us to present colour cuts preferably selecting higher redshift sources of specific type, as well as to discuss possible tests for redshift evolution of the average SED. We compare our predictions with Spitzer First Look Survey data released to date.

**WE-P15-3 17h00**

**Geodetic Precession And The System Geometry Of PSR B1534+12**, Ingrid Helen Stairs<sup>1</sup>, S.E. Thorsett<sup>2</sup> and Z. Arzoumanian<sup>3,1</sup> *University of British Columbia*, <sup>2</sup> University of California and <sup>3</sup> Goddard Space Flight Center — We have conducted high-precision Arecibo observations of the relativistic double-neutron-star binary pulsar B1534+12 since 1998, with data being acquired biweekly and in roughly annual 12-day campaigns. These observations show clear evidence of pulse profile and polarization changes due to geodetic precession of the pulsar's spin axis, which is misaligned with the total angular momentum of the system. We have also found evidence for orbital modulation of the pulse profile due to the special-relativistic effect of aberration. The aberration data and polarization changes can be used to calibrate the scale of the long-term precession effects, resulting in the first quantitative test of the geodetic precession rate in a strong-gravity system. In addition, these observations completely constrain the geometry of the binary system, which otherwise suffers from multiple ambiguities. We discuss implications for asymmetries in supernova explosions and prospects for application to other double-neutron-star systems.

17h15 Session Ends / Fin de la session

**[WE-P16] CAP Council Meeting (New and Old) /  
Réunion du Conseil (nouveau et ancien) de l'ACP**

(CAP/ACP)

**WEDNESDAY, JUNE 16  
MERCREDI, 16 JUIN  
17h00 - 18h30**

[ Room/Salle : Campaign A ]

Chair: M. Morrow, MUN

**[WE-P17] CASCA Closing and Awards Given for Best Student Presentations /  
Clôture et remise des prix aux meilleures présentations d'étudiants  
de la CASCA**

(CASCA)

**WEDNESDAY, JUNE 16  
MERCREDI, 16 JUIN  
17h15 - 17h30**

[ Room/Salle : Campaign B ]

Chair: J. English, U.Manitoba

**Thursday, June 17**

**Jeudi, 17 juin**

TOURS FOR THE OBSERVATORY AND PLANETARIUM (CASCA)

U. of Manitoba Physics Alumni Reunion Events (to celebrate the 100th anniversary of the department)

Meeting of the CAP/NSERC Liaison Committee (09h00 - 12h00) - Strathcona Room, Delta Hotel