Seventh International Heidelberg Conference on Dark Matter in Astro and Particle Physics

18th – 23rd January 2009
Rydges Hotel
Christchurch, New Zealand

Heidelberg Committee:
Professor Hans V Klapdor-Kleingrothaus - Chair
Dr Irina V Krivosheina – Scientific Secretary

University of Canterbury, New Zealand Committee:
Dr Dharam Vir Ahluwalia – Convenor
Dimitri Schritt
Cheng-Yang Lee
Rosalie Reilly
Rhondda Sullivan
### Sunday 18th January

<table>
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<th>Time</th>
<th>Event</th>
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<tbody>
<tr>
<td>5:30 – 8:00pm</td>
<td>Registration</td>
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<tr>
<td>6:00 – 8:00pm</td>
<td>Welcome Reception&lt;br&gt;Drinks and nibbles will be served.</td>
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### Monday 19th January

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
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<tbody>
<tr>
<td>08:00</td>
<td>Registration desk opens</td>
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<tr>
<td>9:00 – 9:10</td>
<td>Welcome</td>
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Chairman of Heidelberg DARK MATTER Conference – H.V.Klapdor-Kleingrothaus, Heidelberg, Germany.
A representative from the Physics and Astronomy Department, University of Canterbury.

**Cold Dark Matter, LHC and TeV-Scale Physics:**

**Chairperson:** H.V.Klapdor-Kleingrothaus, Heidelberg, Germany

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<tr>
<td>09:10 – 09:55</td>
<td>Elisabetta Berberio&lt;br&gt;University of Melbourne&lt;br&gt;Australia&lt;br&gt;SUSY searches at LHC and Dark Matter</td>
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<tr>
<td>09:55 – 10:40</td>
<td>Mayumi Aoki&lt;br&gt;Tohoku University&lt;br&gt;Sendai, Japan&lt;br&gt;Neutrino Mass, Dark Matter and Baryon Assymmetry via TeV-Scale Physics</td>
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**10:40 – 11:10**

**Morning Refreshments-**

**Direct Search for Cold Dark Matter I:**

**Chairperson:** David Wiltshire, University of Canterbury, New Zealand

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<tr>
<td>11:10 – 11:55</td>
<td>Pierluigi Belli&lt;br&gt;INFN, Roma&lt;br&gt;Italy&lt;br&gt;Signals from the Dark Universe: where we are, where we are going?</td>
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<tr>
<td>11:55 – 12:25</td>
<td>Jason Kumar&lt;br&gt;University of Hawaii&lt;br&gt;USA&lt;br&gt;Testing the Dark Matter Interpretation of the DAMA/LIBRA Result with Superkamiokande</td>
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<tr>
<td>12:25 – 12:55</td>
<td>Michel H.G Tytgat&lt;br&gt;University Libre de Bruxelles&lt;br&gt;Belgium&lt;br&gt;WIMP Dark Matter, Higgs Exchange and DAMA</td>
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**12:55 – 14:30**

**LUNCH -**

**Special Session about Gravitation:**

**Chairperson:** Hans.V.Klapdor-Kleingrothaus, Heidelberg, Germany

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<tr>
<td>14:30 – 15:15</td>
<td>Roy Patrick Kerr&lt;br&gt;University of Canterbury&lt;br&gt;New Zealand&lt;br&gt;Cracking the Einstein Code</td>
</tr>
</tbody>
</table>
Gravitation:

Chairperson: Doug Hamilton, Astronomy Department, University of Maryland, USA

15:15 – 15:45  Agnieszka Jacholkowska, CNRS/IN2P3, France  Probing Quantum Gravity effects with astrophysical sources: experimental view.

15:45 – 16:15  Gianfranco Gentile, University of Gent, Belgium  Dark matter modified dynamics? Hints from galaxy kinematics.

Quantum Gravity and Cosmology:

Chairperson: Danny Marfatia, University of Kansas, USA

16:45 – 17:25  David Wiltshire, University of Canterbury, New Zealand  Dark energy without dark energy: Average observational quantities.

17:25 – 17:55  David Rapetti, SLAC, USA  Constraining gravity with the growth of structure in X-ray galaxy clusters.

17:55 – 18:25  Tamara Davis, University of Queensland, Australia  Extracting model-independent constraints from cosmological observations.
Tuesday, 20th January

Large Scale Structure, Dark Energy, Dark Matter and Dark Radiation:

Chairperson: Andreas Eckart, University of Cologne, Germany

09:00 – 09:30  Chris Blake
Swinburne University
Melbourne, Australia
Cosmology with the WiggleZ Dark Energy Survey.

09:30 – 10:00  Matthew Buckley
California Institute of Technology, USA.
Dark matter and dark radiation

10:00 – 10:30  Matt Visser
Victoria University of Wellington
New Zealand
Cosmographic Analysis of Dark Energy

10:30 – 11:00  Morning Refreshments -

Cosmic Ray Positron Excess, Non-Thermal Neutralino Production, Annihilation of Dark Matter:

Chairperson: Tarek Saab, University of Florida, USA

11:00 – 11:30  Koji Ishiwata
Tohuku University
Japan
PAMELA and ATIC Anomalies in Decaying Gravitino Dark Matter Scenario

11:30 – 12:10  Iris Gebauer
Karlsruhe University
KIT, Germany
Dark Matter annihilation in the light of EGRET, PAMELA, WMAP and ROSAT

12:10 – 12:45  Kazunori Nakayama
University of Tokyo
Japan
Signatures of Dark Matter Annihilation in the Light of PAMELA/ATIC Anomaly

12:45 – 13:15  Nicole Bell
The University of Melbourne, Australia
Dark Matter Annihilation to Electrons, Neutrinos and Gamma Rays

13:15 – 15:00  LUNCH-

Dark Mass at the Center of the Galaxy:

Chairperson: Norma Susana Mankoc Borstnik, University of Ljubljana, Slovenia

15:00 – 15:40  Andreas Eckart
University of Cologne
Germany
Lunimous accretion onto the dark mass at the centre of the Milky Way

15:40 – 16:10  Patrick Scott
Stockholm University
Sweden
Dark stars at the Galactic centre

16:10 – 16:35  Katie Howard
Nacquarie University
Sydney, Australia
Relativistic Signatures at the Galactic Centre
**Dark and Baryonic Matter in Galaxies:**

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<tr>
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<tr>
<td>17:05 – 17:40</td>
<td>Benoit Famaey (Universite Libre de Bruxelles, Belgium)</td>
<td>The observed distribution of dark and baryonic matter in galaxies: an intriguing conspiracy</td>
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<tr>
<td>17:40 – 18:10</td>
<td>Felix Stoehr (ST-ECF/ESO, Munich, Germany)</td>
<td>Annihilation in the Milky Way: Simulated distribution of Dark Matter on small scales</td>
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<tr>
<td>18:10 – 18:40</td>
<td>Denis Puy (Université Montpellier II, France)</td>
<td>Primordial molecules and first structures</td>
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<tr>
<td>18:40 – 19:05</td>
<td>Yousef Sobouti (Institute of Advanced Studies in Basic Sciences, Zanjan, Iran)</td>
<td>Dark companion of Baryonic matter</td>
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### Wednesday, 21st January

#### Dark Matter and SUSY I:

**Chairperson:** Michel H.G Tytgat, University Libre de Bruxelles.

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<tr>
<th>Time</th>
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</table>
| 09:00 – 09:40 | Leszek Roszkowski  
University of Sheffield  
U.K. | Cold Dark Matter and SUSY                           |
| 09:40 – 10:10 | Gilbert Moultaka  
Université Montpellier  
France | Scenarios of Gravitino dark matter and their cosmological and particle physics implications |
| 10:10 – 10:40 | Yudi Santoso  
Durham, England | The Phenomenology of Gravitino Dark Matter                  |

**10:40 – 11:10**  
**Morning Refreshments**

#### Hot Dark Matter, Dark Matter and SUSY II:

**Chairperson:** Terry Goldman, Los Alamos, NM, USA.

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<tr>
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| 11:10 – 11:55 | H.V. Klapdor-Kleingrothaus  
Heidelberg, Germany | Hot Dark Matter from Neutrinos – News from Double Beta Decay  |
| 11:55 – 12:30 | Csaba Balazs  
Monash University  
Melbourne | Dark matter in extended supersymmetric theories               |

**12:30 – 14:30**  
**LUNCH**

#### Dark Matter, Dark Energy, Extra Dimensions and Sterile Fermions:

**Chairperson:** Leszek Roszkowski, University of Sheffield, UK.

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<tr>
<th>Time</th>
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| 14:30 – 15:10 | Ishwaree Neupane  
University of Canterbury  
New Zealand | Dark Matter and Dark Energy in Models with Warped Extra Dimensions |
| 15:10 – 15:50 | Y.M. Cho  
Seoul National University  
Korea | Extra Dimension, Hierarchy Problem, and Dark Matter           |
| 15:50 – 16:30 | Terry Goldman  
Los Alamos, NM, USA | A Possible Connection Between Sterile Fermion Mass and Dark Energy |

**19:30**  
**Banquet Dinner at Two Fat Indians Restaurant**

**Evening Speaker:** Doug Hamilton, Astronomy Department, University of Maryland, USA.

*When Neptune met Triton*
Thursday, 22nd January

Dark Matter and Non-Standard Wigner Classes I:

Chairperson: Roy Patrick Kerr, University of Canterbury, New Zealand.

09:00 – 09:40 Ben Martin
University of Canterbury
New Zealand

Quantum fields, dark matter and non-standard Wigner classes

9:40 – 10:25 Dharam Vir Ahluwalia
University of Canterbury
New Zealand

Dark matter and spacetime symmetries

10:25 – 11:00 Dimitri Schritt & Cheng-Yang Lee
University of Canterbury

On the subtle features of Elko field

11:00 – 11:25 Morning Refreshments -

X-Rays and Dark Matter, GeV Gamma Rays:

Chairperson: Koji Ishiwata, Tohuku University, Japan.

11:25 – 12:05 Stefano Profumo
University of California
Santa Cruz, USA.

Fundamental Physics and GeV Gamma Rays

12:05 – 12:35 Tesla Jeltema
Santa Cruz, CA, USA

Searching for Signals from Dark Matter Annihilation in X-rays

12:35 – 13:10 David Buote
University of California
Irvine, USA

Weighing Supermassive Black Holes with X-Ray- Emitting Gas

13:10 – 15:00 LUNCH

Fifth Family and Dark Matter, Nonextensive Statistics and DM/Dark Energy Theory:

Chairperson: Felix Stoehr, ST-ECF/ESO, Munich, Germany.

15:00 – 15:45 Norma Susana Mankoc Borstnik
University of Ljubljana
Slovenia

Is the fifth family, predicted by the approach unifying spins and charges, the candidate for forming the dark matter clusters?

15:45 – 16:20 Manfred Leubner
University of Innsbruck
Austria

Nonextensive statistics in astro-particle physics: status and impact for dark matter / dark energy theory

16:20 – 16:50 Afternoon Refreshments -

Fine Structure Constant, Dark Energy Perturbations, Non-Standard Wigner Classes II:

Chairperson: Agnieszka Jocholkowska, CNRS/IN2P3.

16:50 – 17:20 Danny Marfatia
University of Kansas
USA

Phase transition in the fine structure constant

17:20 – 17:50 Javier Grande
University de Barcelona

Dark energy perturbations and possible solution to the coincidence problem
Friday, 23rd January

Indirect Search for Dark Matter I – AMANDA, ICECUBE and ANTARES

Chairperson: Patrick Scott, Stockholm University, Sweden.

09:00 – 09:35 – Seon-Hee Seo, Stockholm University
Recent results and Status of IceCube
AlbaNova University Center, Stockholm, Sweden

09:35 – 10:05 Alfio Rizzo, Vrije Universiteit Brussel, Belgie
Search for Dark Matter with AMANDA and IceCube detectors

10:05 – 10:45 Holger Motz, Erlangen Centre for Astroparticle Physics, Germany
Indirect Search for Dark Matter with the ANTARES Neutrino Telescope

10:45 – 11:10 Morning Refreshments -

Indirect Search for Dark Matter II – Atmospheric Cherenkov Telescopes, Direct Search for Cold Dark Matter II:

Chairperson: Pierluigi Belli, INFN, Roma Italy

11:10 – 11:40 Emmanuel Moulin, CEA Saclay DSM/IRFU, France
Indirect dark matter searches with imaging atmospheric Cherenkov telescopes
(for the H.E.S.S. collaboration)

11.40 – 12.10 Emmanuel Moulin, CEA Saclay DSM/IRFU, France
A search for a dark matter annihilation signal towards the Canis Major dwarf galaxy.
(for the H.E.S.S. collaboration)

12:10 – 12:40 Tarek Saab, University of Florida, USA
Hot on the tail of the elusive WIMP: Direct detection dark matter searches enter the 21st century.

12:40 – 13:10 Nigel Smith, Rutherford Lab, UK
Recent Results from the ZEPLIN-III

13:10 – 14:30 LUNCH

Direct Search for Cold Dark Matter III:

Chairperson: Manfred Leubner, University of Innsbruck, Austria

14:30 – 15:25 Paul Scovell, University of Edinburgh, UK
A Design Study for the Vecto Detector Upgrade of ZEPLIN-III

15:25 – 15:55 Irina.V.Krivosheina, Heidelberg, Germany
Dark Matter Search with Detectors in Liquid Nitrogen

15:55 – 16:35 Chung-Lin Shan, Seoul National University, Republic of Korea
How Precisely Could We Identify WIMPS Model-Independently from Direct Dark Matter Detection?
### Exotics:

**Chairperson:** Alfio Rizzo, Vrije Universiteit Brussel, Brussel, Belgie

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<tr>
<td>16:35 – 17:05</td>
<td>Andrew Beckwith</td>
<td>Hypothetical Dark Matter/Axion rockets: What can be said about Dark Matter in terms of space physics propulsion</td>
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*End of Dark 2009 Conference*