

# INTERNATIONAL WORKSHOP: v-DARK 2015



**December 7-9, 2015**  
**TUM Institute for Advanced Study**

MONDAY, DECEMBER 7, 2015

**Session on Sterile Neutrinos in Particle Physics and Cosmology**

- 9:30**            **Welcome**  
Thierry Lasserre (CEA & TUM-IAS)
- 9:40**            **Theoretical Review on Dark Matter**  
Frank Daniel Steffen (Max Planck Institute for Physics, Munich)
- 10:10**          **Experimental Review on Dark Matter: WIMPS**  
Federica Petricca (Max Planck Institute for Physics, Munich)
- 10:35**          **Experimental Review on Dark Matter: Axions**  
Javier Redondo (PMI/Spain)
- 11:00            *Coffee break*
- 11:30**          **Review on Neutrinos in the Standard Model of Particle Physics and Beyond**  
Thomas Schwetz (KIT)
- 12:00**          **Review on Neutrinos in the Standard Model of Cosmology and Beyond**  
Ninetta Saviano (University of Mainz)
- 12:30            *Lunch (Faculty Club, 4<sup>th</sup> floor)*

**Session on Dark Matter at Galactic Scales**

- 14:00**          **Structure Formation and Missing Dwarf Galaxies**  
Aurel Schneider (Institute for Computational Science, University of Zurich)
- 14:30**          **Inner Density Profiles of Small Galaxies**  
Chris Brook (Universidad Autónoma de Madrid)
- 15:00**          **The Too-big-to-fail Issue**  
Emmanouil Papastergis (University of Groningen, Netherlands)
- 15:30            *Coffee Break*

**Session on Observables/Constraints Related to keV Neutrino Dark Matter (1)**

- 16:00**          **The Observable Signature / Constraints on Sterile Neutrinos Based on Lyman Alpha Forest Data**  
Antonella Garzilli (Lorentz Institute, Leiden University)
- 16:30**          **Past Search for keV Neutrinos in Beta-Rays**  
Otokar Dragoun (Nuclear Physics Institute of the Academy of Science of the Czech Republic)
- 17:00**          **Supernovae, Pulsar Kick & Sterile Neutrinos**  
Steen Hansen (Niels Bohr Institute, University of Copenhagen)
- 17:30**          **WDM Constraints from the High-Redshift Universe**  
Andrea Lapi (SISSA)
- 18:00**          **End**

TUESDAY, DECEMBER 8, 2015

Session on Observables/Constraints Related to keV Neutrino Dark Matter (2)

- 9:30**      **X-ray observations and the 3.5 keV Line**  
Jeroen Franse (Instituut Lorentz & Leiden Observatory)
- 10:15**      **X-ray observations and the 3.5 keV Line**  
Michael Anderson (Max-Planck Institute for Astrophysics, Munich)
- 10:45      *Coffee break*
- 11:15**      **X-ray observations and the 3.5 keV Line**  
Tesla Jeltema (University of California, Santa Cruz)
- 11:45**      **New detections of 3.5 keV emission line in cosmic objects and directions for its future studies**  
Dmytro Iakubovskiy (Bogolyubov Institute for theoretical Physics)
- 12:15      *Lunch (Faculty Club, 4<sup>th</sup> floor)*

Session on keV Neutrino Production in the Early Universe

- 14:00**      **keV Neutrino Production in the Early Universe: Thermal (resonant or non-resonant) Production**  
Mikko Laine (University of Bern)
- 14:40**      **keV Neutrino Production in the Early Universe: Scalar Decay**  
Alex Merle (Max-Planck-Institut für Physik, Munich)
- 15:20**      **keV Neutrino Production in the Early Universe: Entropy Dilution**  
Miha Nemevšek (Jožef Stefan Institute)
- 16:00      *Coffee break*

Session on keV Neutrino Theory and Model Building

- 16:30**      **Models based on Suppression Mechanisms**  
Naoyuki Haba (Shimane University)
- 17:00**      **keV Neutrino Theory and Model Building**  
Claudia Hagedorn (Excellence Cluster Universe, TUM)
- 17:30**      **The NuMSM Model**  
Marco Drewes (Technische Universität München)
- 18:00**      ***End***
- 18:30      *Conference dinner (Faculty Club, 4<sup>th</sup> floor)*

WEDNESDAY, DECEMBER 9, 2015

**Session on Future Experiments**

- 9:30 Search for keV Sterile Neutrino Dark Matter with X-ray Micro Calorimeter Sounding Rockets**  
Enectali Figueroa-Feliciano (Northwestern University)

**Session on Future Laboratory Experiments**

- 10:00 Search for keV Neutrino with Tritium Beta Decay in KATRIN**  
Susanne Mertens (LBNL)
- 10:30 Search for keV Neutrinos with Full Kinematics Information of Tritium Decay**  
Ernst Otten (Heidelberg University)
- 10:45 *Coffee break*
- 11:15 Search for keV Neutrinos with Ho163 Electron Capture Experiments**  
Loredana Gastaldo (Heidelberg University)
- 11:45 keV Relic Neutrino Capture on Tritium**  
Andrew J. Long (KICP, University of Chicago)
- 12:15 *Lunch*
- 13:45 The SHIP experiment**  
Richard Jacobsson (CERN)
- 14:15 SHIP and the NuMSM**  
Shintaro Eijma (EPFL)

**Session on Future Astrophysical Experiments**

- 14:35 Current and Future constraint on sterile neutrinos based on Lyman alpha forest data**  
Matteo Viel (INAF/OATs)
- 15:05 Search for keV Sterile Neutrinos with the Astro-H satellite**  
Daniel Maier (APC)
- 15:35 Discussion tutorial**  
Susanne Mertens
- 15:45 *Interactive Coffee break*
- 16:15 General discussion and concluding remarks**  
Alex Merle, Susanne Mertens
- 17:00 End of Workshop**



Technische Universität München · Institute for Advanced Study  
Lichtenbergstraße 2 a · 85748 Garching · Tel. +49.89.289.10550 · [info@tum-ias.de](mailto:info@tum-ias.de) · [www.tum-ias.de](http://www.tum-ias.de)

In collaboration with:  
Excellence Cluster Universe, CEA, invisibles, Max-Planck-Gesellschaft, TUM Physics Department E15