

# HAP Workshop 2014

on data analysis for indirect **dark matter** searches

## Topics

- Experimental status of dark matter detection
- Supersymmetry
- Dark matter particle physics and codes
- N-body simulations

- Astrophysics and J-factor calculation
- Foregrounds
- Complementarity of LHC, direct and indirect searches
- Statistics for dark matter searches

**March 10-13, 2014**  
in Berlin (Adlershof)

### WLAN (except eduroam users):

- Network name: HU-Meeting
- Username and password: see your name badge

# **Welcome to the HAP Workshop 2014**

**Ulli Schwanke (HU Berlin)**

**Gernot Maier, Rolf Bühler, Markus Ackermann (DESY)**

**Klaus Eitel (KIT), Lutz Köpke (U Mainz)**

**The Organization Committee**



Alliance for Astroparticle Physics



# The Helmholtz Alliance

# Welcome

# Helmholtz Alliance for Astroparticle Physics (HAP)



Alliance for Astroparticle Physics

<http://www.hap-astroparticle.org>

[schwanke@physik.hu-berlin.de](mailto:schwanke@physik.hu-berlin.de) (Ulli Schwanke)

# WLAN

- **There are two options :**
- **Eduroam** (permanent)
- **Local account** (only during the workshop)
  - **Network name: HU-Meeting**
  - **Username and password: see your name badge**
  - **Note that bandwidth restrictions apply and that sessions are restricted to 12h**

# It's a Workshop

- **The HAP DM Workshop will comprise lectures (on Mon afternoon and in the mornings) and three afternoons with hands-on exercises on your laptop**
- **We have prepared a virtual machine with the needed software packages – please copy it from the USB stick and try to run VirtualBox**



- **Exercises cover many aspects: usage of software, calculation of fluxes and rates, detector response, event statistics, calculation of confidence intervals, ...**
- **Help will be provided and the main aim is to have fun!**
- **More details will be given on Tuesday afternoon**

# Today – Monday (Mar 10)

12:00	<b>Arrival and Registration</b>	
13:00	<i>0'119, Berlin (Adlershof)</i>	12:00 - 13:30
	<b>Workshop Introduction - Welcome</b>	
	<i>0'119, Berlin (Adlershof)</i>	13:30 - 14:00
14:00	<b>Introduction into SUSY I</b>	
	<b>Karol Kovarik (Uni Münster)</b>	
15:00	<i>0'119, Berlin (Adlershof)</i>	14:00 - 15:30
	<b>Coffee</b>	
	<i>0'119, Berlin (Adlershof)</i>	15:30 - 16:00
16:00	<b>Introduction into SUSY II</b>	
17:00	<i>0'119, Berlin (Adlershof)</i>	16:00 - 17:15

# Tuesday (Mar 11)

09:00	<b>Dark Matter Searches: introduction and experimental status</b> <b>Thomas Lohse (HU Berlin)</b> <i>0'119, Berlin (Adlershof)</i>	09:00 - 10:15
10:00	<b>Coffee</b> <b>Poster session</b> <i>0'119, Berlin (Adlershof)</i>	10:15 - 10:45
11:00	<b>DM Particle Physics</b> <b>Joakim Edsjö</b> <i>0'119, Berlin (Adlershof)</i>	10:45 - 12:00
12:00	<b>DM Codes</b> <b>(Uni Stockholm)</b> <i>0'119, Berlin (Adlershof)</i>	12:00 - 13:00
13:00	<b>Lunch</b> <i>0'119, Berlin (Adlershof)</i>	13:00 - 14:00
14:00	<b>Workshop &amp; Discussions</b>	
15:00	<b>Louise Oakes and Ulli Schwanke (HU Berlin) et al.</b> <i>0'119, Berlin (Adlershof)</i>	14:00 - 15:30
16:00	<b>Coffee</b> <i>0'119, Berlin (Adlershof)</i>	15:30 - 16:00
17:00	<b>Workshop &amp; Discussions</b> <i>0'119, Berlin (Adlershof)</i>	16:00 - 17:30
18:00	<b>Workshop Dinner</b> <b>Workshop dinner</b>	
19:00	<i>TBD</i>	17:30 - 19:30

- We'll start at 9am in the morning
- Poster session in the first coffee break. Authors, please get a coffee and be available at your poster....

# Dinner

- **Tuesday Mar 11 at 6:30 pm** in the German-style restaurant „Ratskeller Köpenick“ (located in the town hall of Köpenick)
- **Cost: 26 EUR (excluding drinks), please pay yourself at the restaurant**
- **Address: Alt-Köpenick 21, 12555 Berlin**
- **See handout and workshop web page for details**



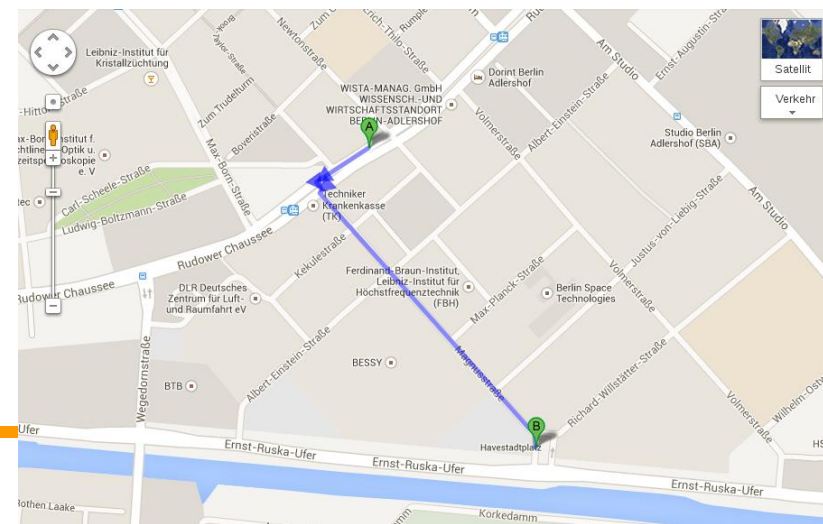


# Wednesday (Mar 12)

09:00	<b>N-Body Simulations</b> <b>Miguel Sanchez-Conde (SLAC)</b>	
10:00	<i>0'119, Berlin (Adlershof)</i>	09:00 - 10:15
	<b>Coffee</b>	
	<i>0'119, Berlin (Adlershof)</i>	10:15 - 10:45
11:00	<b>J-Factor Calculation</b> <b>David Maurin (LPSC)</b>	
	<i>0'119, Berlin (Adlershof)</i>	10:45 - 12:00
12:00	<b>Foreground</b> <b>Miguel Sanchez-Conde (SLAC)</b>	
	<i>0'119, Berlin (Adlershof)</i>	12:00 - 13:00
13:00	<b>Lunch</b>	
		13:00 - 14:00
14:00	<b>Workshop &amp; Discussions</b> <b>Gernot Maier and Moritz Hütten (DESY, Zeuthen) et al.</b>	
15:00	<i>0'119, Berlin (Adlershof)</i>	14:00 - 15:30
	<b>Coffee</b>	
	<i>0'119, Berlin (Adlershof)</i>	15:30 - 16:00
16:00	<b>Future of Dark Matter Searches</b> <b>Klaus Eitel (KIT) and Markus Ackermann (DESY, Zeuthen)</b>	
17:00	<i>0'119, Berlin (Adlershof)</i>	16:00 - 17:30
18:00	<b>Visit to the CTA mid size telescope prototype</b> <b>sightseeing</b>	
	<i>0'119, Berlin (Adlershof)</i>	17:30 - 18:30

# Sights...

- There is a medium-size CTA prototype telescope (12 m diameter) on the campus
- We'll offer a guided tour on Wednesday after the sessions
- It's just 650m away: walk down Magnusstraße and go to Havestadtplatz



# Thursday (Mar 13)

09:00	<b>Statistics</b> <b>Philip Bechtle (Uni Bonn)</b>	
10:00	<i>0'119, Berlin (Adlershof)</i>	09:00 - 10:15
	<b>Coffee</b>	
	<i>0'119, Berlin (Adlershof)</i>	10:15 - 10:45
11:00	<b>Workshop &amp; Discussions</b> <b>Rolf Bühler and Markus Ackermann (DESY, Zeuthen) et al.</b>	
12:00	<i>0'119, Berlin (Adlershof)</i>	10:45 - 13:00
13:00	<b>Lunch</b>	
	<i>0'119, Berlin (Adlershof)</i>	13:00 - 14:00
14:00	<b>Complementarity of LHC, direct and indirect searches</b> <b>Philip Bechtle (Uni Bonn)</b>	
15:00	<i>0'119, Berlin (Adlershof)</i>	14:00 - 15:30
	<b>Departure</b>	
16:00	<i>0'119, Berlin (Adlershof)</i>	15:30 - 16:30

# HAP Workshop 2014

on data analysis for indirect **dark matter** searches

**Enjoy the workshop – and do not hesitate to ask questions or to solicit help!**

## Topics

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- Supersymmetry
- Dark matter particle physics and codes
- N-body simulations

- Astrophysics and J-factor calculation
- Foregrounds
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**The End**

**That's it.**

# Lunch Options



**Restaurant  
„Esswirtschaft“ (4-8 EUR)**

**WISTA Canteen (3-6 EUR)**

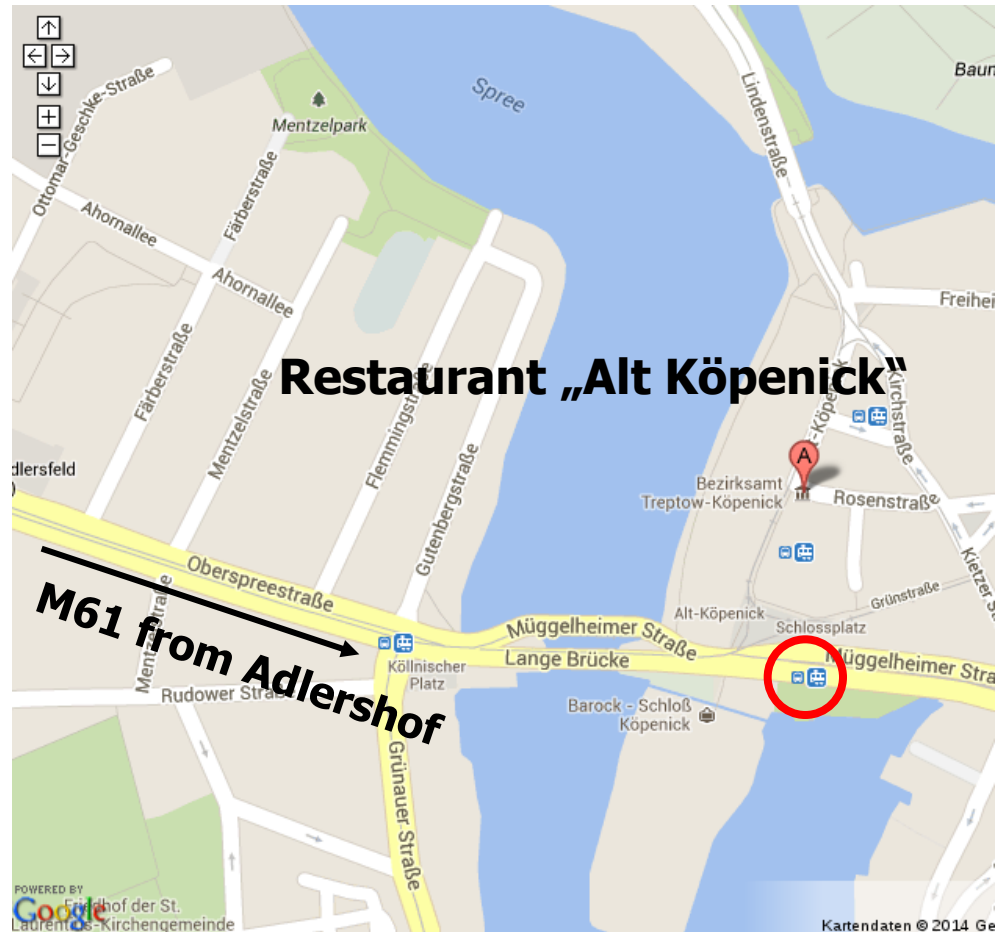
**Student's Canteen  
„Oase“ (3-5 EUR)**

**★ =Coffee places**

- **All within easy walking distance**
- **Reductions for students (with student's ID card) in „Oase“**
- **Will reconvene at 2pm**

# Dinner – how to get there

- **Tue Mar 11, 6:30pm**
- **Board the tram M61 at the stop „Magnusstraße“ (in front of the ESZ)**
- **Direction „Rahnsdorf/Waldschänke“ (towards S-Bahn station „Adlershof“ )**
- **Zone B ticket, 14 min ride**
- **Get off at stop „Schlossplatz“ and walk north**
- **Address: Alt-Köpenick 21, 12555 Berlin**



**Tram stop „Schloßplatz“**

# Dinner – how to get there

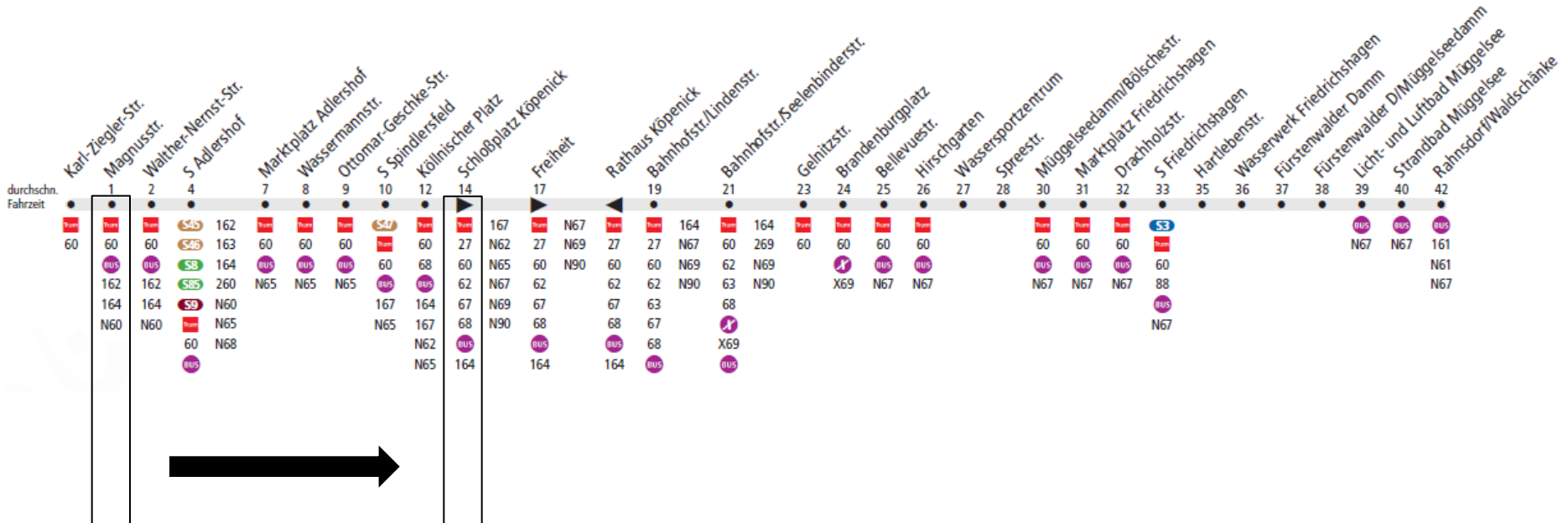
Tram

61

Adlershof, Karl-Ziegler-Str. ◀ ▶ Rahnsdorf/Waldschänke

BVG

Tariffbereich Berlin  
Teilbereich B





# Dinner – return options

from: **Schloßplatz Köpenick (Berlin)** 

to: **Adlershof (Berlin) (S)** 

Departure: **Tu, 11.03.14 22:00**
































 [Bookmark](#)  [Meine BVG](#)

[New request](#)

[Change query](#)

[Return journey](#)

## Connections overview

Details	Date	Departure	Arrival	Duration	Changes	Products	Fare
 sooner							
<input type="checkbox"/>	11.03.14	21:09	21:25	0:16	1	  	2.60 EUR
<input type="checkbox"/>	11.03.14	21:21	21:34	0:13	1	 	2.60 EUR
<input type="checkbox"/>	11.03.14	21:29	21:45	0:16	1	  	2.60 EUR
<input type="checkbox"/>	11.03.14	21:39	21:54	0:15	1	 	2.60 EUR
<input checked="" type="checkbox"/>	11.03.14	21:49	22:05	0:16	1	  	2.60 EUR
<input type="checkbox"/>	11.03.14	21:59	22:14	0:15	1	 	2.60 EUR
<input checked="" type="checkbox"/>	11.03.14	22:09	22:25	0:16	1	  	2.60 EUR
<input checked="" type="checkbox"/>	11.03.14	22:19	22:34	0:15	1	 	2.60 EUR
<input type="checkbox"/>	11.03.14	22:29	22:45	0:16	1	  	2.60 EUR
<input type="checkbox"/>	11.03.14	22:39	22:54	0:15	1	 	2.60 EUR
<input type="checkbox"/>	11.03.14	22:49	23:05	0:16	1	  	2.60 EUR
<input type="checkbox"/>	11.03.14	22:59	23:14	0:15	1	 	2.60 EUR

Map	Station	Time	Comments	Platform
	 Schloßplatz Köpenick (Berlin)	dep: 22:09	  Bus 164 Direction: S Kaulsdorf <sup>[1]</sup> <i>departures in 20 - 21 minutes cycle</i>	
	 Freiheit (Berlin)	arr: 22:11	 walk (4 min.)	
	 Rathaus Köpenick (Berlin)	dep: 22:15	  Tra 60 Direction: Adlershof, Karl-Ziegler-Str. <sup>[1]</sup> <sup>[2]</sup>	
 	 S Adlershof (Berlin)	arr: 22:25		

Map	Station	Time	Comments	Platform
	 Schloßplatz Köpenick (Berlin)	dep: 22:19	  Bus 167 Direction: Puschkinallee/Eisenstr. <sup>[1]</sup> <i>next alternative departures: Bus 167 dep 22:39, Bus 167 dep 22:59, Bus 167 dep 23:19, Bus 167 dep 23:39, Bus 167 dep 23:59</i>	
	 Köllnischer Platz (Berlin)	arr: 22:20		
	 Köllnischer Platz (Berlin)	dep: 22:25	  Bus 164 Direction: Flughafen Schönefeld Airport <sup>[1]</sup> <i>next alternative departures: Bus 164 dep 22:45, Bus 164 dep 23:05, Bus 164 dep 23:25, Bus 164 dep 23:45, Bus 164 dep 00:05</i>	
 	 S Adlershof (Berlin)	arr: 22:34		

Einzelfahrausweis: 2.60 EUR, day ticket: 6.70 EUR; Duration: 0:15; operates on 11.03.14

# Thank you

- **HAP – for financial support 😊**
- **Speakers and organizers**
- **Louise Oakes (for setting up the virtual machine) and Moritz Hütten (for the tutorials on Wednesday)**
- **Frank Olzog, Harald Kasper and York Wüst - for the technical support in the ESZ**
- **Martina Mende, Katrin Varschen, Astrid Chantelauze, Axel Hagedorn – for the organization**