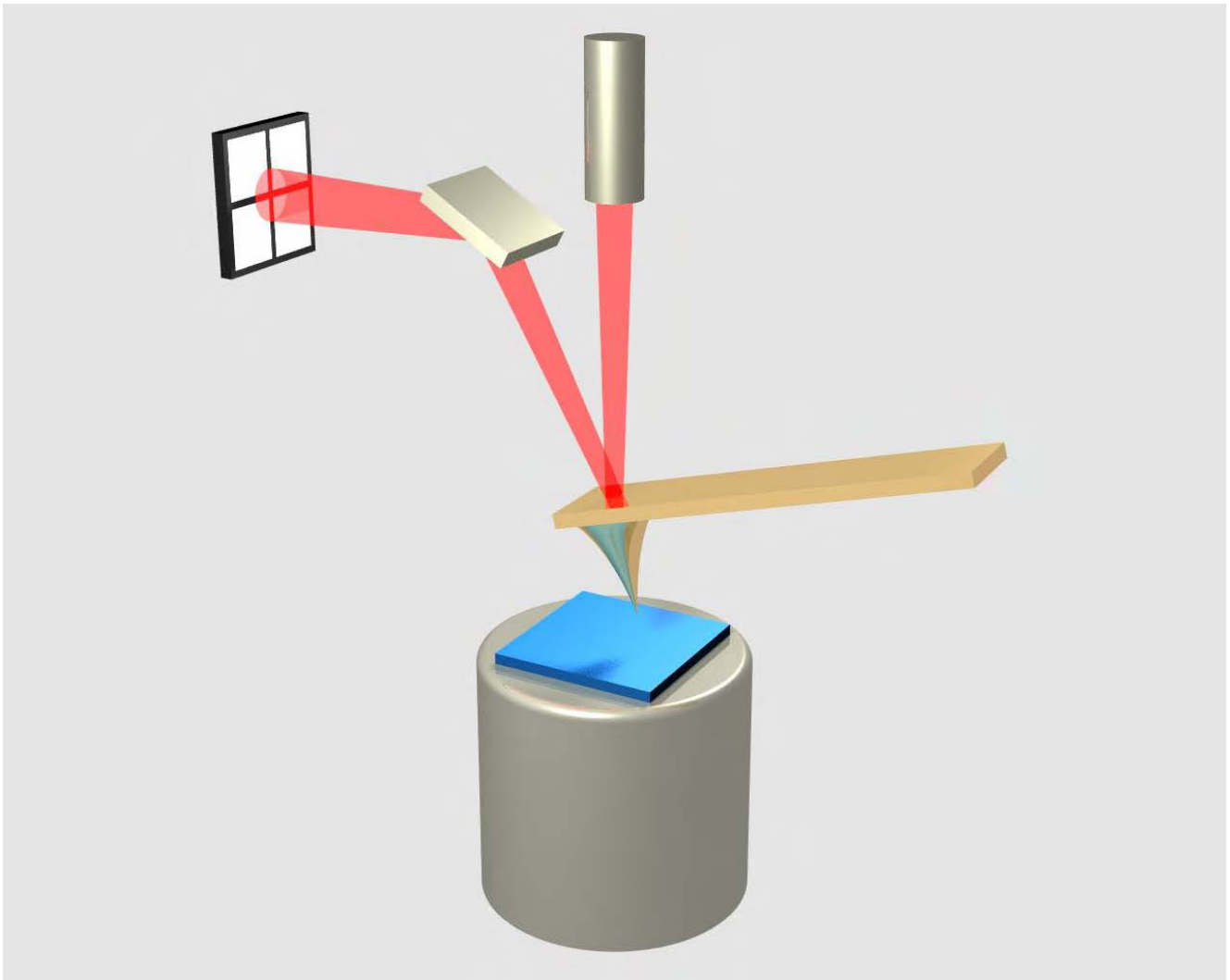


International Workshop on  
**Advanced Atomic Force Microscopy Techniques**

*March 1-2, 2010*

Karlsruhe Institute of Technology (Campus North)



# CONFERENCE PROGRAM

# Welcome!

As the organizers of the workshop we take great pleasure in welcoming you to the “*International Workshop on Advanced Atomic Force Microscopy Techniques*”. This workshop is planned as a forum for the exchange of new ideas about new AFM techniques which will help to explore the nanoworld in more detail.

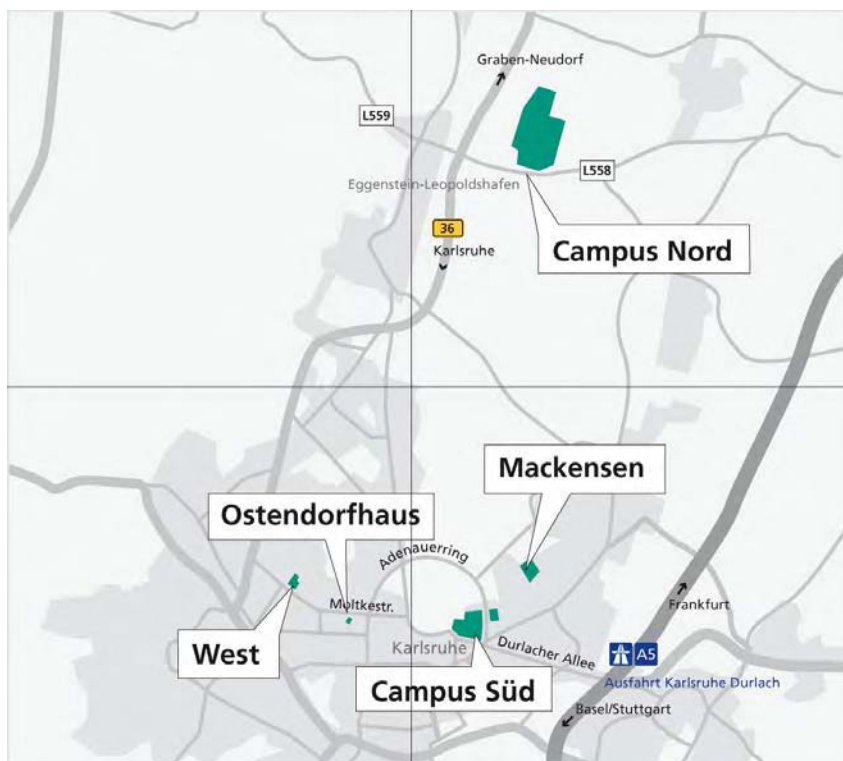
The venue of the workshop is the *Karlsruhe Institute of Technology* (KIT) which was founded on October 01, 2009, by a merger of Forschungszentrum Karlsruhe and Universität Karlsruhe. The basis was the KIT Merger Act that was adopted unanimously by the Baden-Württemberg state parliament in July 2009. KIT bundles the missions of both precursory institutions: A university of the state of Baden-Württemberg with teaching and research tasks and a large-scale research institution of the Helmholtz Association conducting program-oriented preminent research on behalf of the Federal Republic of Germany. Within these missions, KIT is operating along the three strategic fields of action of research, teaching, and innovation. With 8000 employees and an annual budget of about EUR 700 million, one of the largest research and teaching institutions worldwide is established in Karlsruhe.

Fortunately, we receive significant support for this workshop from the KIT, the IMT, the INT and the Karlsruhe Nano Micro Facility (KNMF). Furthermore, we acknowledge sponsoring by Atomic Force F&E GmbH, Schaefer Technologie GmbH, Omicron Nanotechnology GmbH, SPECS Surface Nano Analysis GmbH, and Zurich Instruments. An additional hands-on workshop is organized on March 3, 2010, by Veeco Instruments GmbH.

We hope that you will enjoy the workshop and have a wonderful time in Karlsruhe.

Hendrik Hölscher, Institute for Microstructure Technology

Thomas Schimmel, Institute of Nanotechnology



## How to Reach the Karlsruhe Institute of Technology

The Karlsruhe Institute of Technology is distributed over several locations. While the Campus North is situated in the administrative district of Karlsruhe near Eggenstein-Leopoldshafen, the Campus South is about 10 km away in the heart of the city of Karlsruhe.

The AFM-workshop takes place at the Campus North (Campus Nord) in seminar room of the Institute for Microstructure Technology (IMT). You will be asked for your identity card at the front gate of the research centre.

## How to Reach the Campus North by Car

The Campus North is located in Eggenstein-Leopoldshafen (about 12 km north of Karlsruhe). The address for your GPS is: Hermann-von-Helmholtz-Platz 1, 76344 Eggenstein-Leopoldshafen

### Coming from North: Frankfurt and Heidelberg (A5)

- Leave the motorway at the exit of Bruchsal and go in the direction of Karlsdorf-Neuthard / Gernersheim / B35.
- Stay on this road for some 4 km, and then turn off on the B36.
- Leave the B36 after some 12 kilometers, at the exit of Eggenstein-Leopoldshafen / Forschungszentrum
- After about 1 km, you reach the entrance road to the Campus North on your left.

### Coming from Northwest: Landau (A65)

- Leave the motorway at the Knielingen exit and go straight ahead on the road (Rheinbrückenstraße) for another 3 km as far as to the Neureuter Straße junction (after having passed the premises of Siemens AG).
- Then turn left in the direction of Mannheim (B 36). Go straight ahead at all following junctions.

- After some 10 km, turn right at the exit of Bruchsal / Stutensee / KIT Campus Nord.
- Go ahead for another 1 km until you reach the entrance road to the Campus North on your left.

#### Coming from East: Munich and Stuttgart (A8)

- At the Karlsruhe motorway triangle, turn off in the direction of Karlsruhe / Frankfurt (A5).
- Leave the motorway at the Karlsruhe-Mitte exit and go in the direction of Landau/Pfalz (B10).
- Stay on this road another 9 km and turn off in the direction of Mannheim (B36).
- Drive straight ahead on the B36 at all junctions.
- Leave the B36 after some 11 km at the exit of Bruchsal / Stutensee / Forschungszentrum.
- After about 1 km, you reach the entrance road to the Campus North on your left.

#### Coming from South: Basel and Freiburg (A5)

- Leave the motorway at the exit No 48 Karlsruhe Süd and go in the direction of Karlsruhe / Landau-Pfalz (B10).
- Stay on this road another 4 km and turn off in the direction of Mannheim (B36).
- Drive straight ahead on the B 36 at all junctions.
- Leave the B 36 after some 11 km at the exit of Bruchsal / Stutensee / KIT Campus Nord.
- After about 1 km, you reach the entrance road to the Campus North on your left.

## **How to Reach the Campus North by Public Transport**

The Campus North is located in Eggenstein-Leopoldshafen. There are various ways to get there by bus or tram from Karlsruhe city or Central Train Station. The exact times of departure are available on the website of the Karlsruher Verkehrsverbund ([www.kvv.de](http://www.kvv.de)). Information about travel data of the German Railway is provided by the Deutsche Bundesbahn ([www.bahn.de](http://www.bahn.de)).

#### Tram lines S 1 / S 11 from Karlsruhe Hauptbahnhof (Central Station) to the destinations of Leopoldshafen/Hochstetten

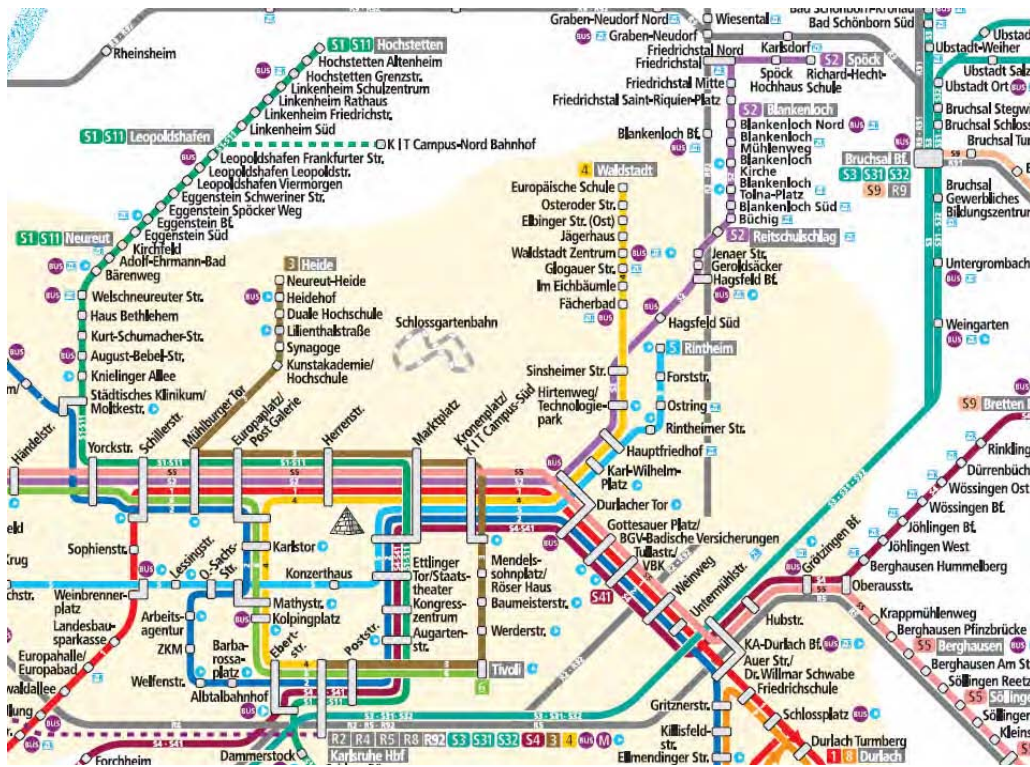
- Trams operate in 20-minute intervals; traveling time is approx. 40 minutes.
- Go by tram to stop "Leopoldstraße" at Leopoldshafen, change to bus No. 195 as far as "Forschungszentrum-Südtor" (southern entrance gate to the Campus North).

#### Regional train R 2 from Karlsruhe Hauptbahnhof (Central Station) to the destinations of Blankenloch Station/Mannheim.

- Trains operate in 60-minute intervals; travelling time is 25 minutes.
- At Blankenloch Station, change to bus No. 195 as far as "KIT Campus Nord"

#### Tram line S 2 from the Karlsruhe Central Business District (Kaiserstrasse) via Durlacher Tor in the direction of Blankenloch Nord.

- Trams operate in 20-minute intervals; traveling time is 36 minutes.
- At the "Blankenloch Nord" stop, change to bus No. 195 as far as "KIT Campus Nord"



### Taxi Services in Karlsruhe

Taxi Funk Zentrale +49 721 / 94 41 44

Minicar/Citycar +49 721 / 56 50 50

### WLAN / WiFi

Wireless internet is available in the seminar room. Please have a look on the instructions in this booklet. The information you need to create a guest account is:

Event: Gaeste FZK KW 08+09

Password: goldig

**Monday, March 1, 2010**

- 10:00 shuttle bus from the Hotel Renaissance Karlsruhe to the KIT Campus North
- 10:30 OPENING COFFEE & REGISTRATION  
*Chair: Volker Saile*
- 11:00 WELCOME  
*Hendrik Hölscher & Thomas Schimmel, Karlsruhe Institute of Technology*
- 11:10 Nanoanalytics based on nanomechanics: applications in life sciences  
*Christoph Gerber, University of Basel*
- 12:00 Self-assembly of three-dimensional wax crystals and self-healing of gaps in the wax coating on living plant surfaces  
*Kerstin Koch, University of Applied Science, Rhine Waal*
- 12:40 LUNCH  
*Chair: Ricardo Garcia*
- 13:40 Charge measurement of atoms and atomic resolution of molecules with Noncontact AFM  
*Leo Gross, IBM Research Zurich*
- 14:20 Beyond imaging: NC-AFM studies on aluminium oxide on NiAl(110)  
*Lars Heinkel, Fritz-Haber-Institut, Berlin*
- 14:35 Recent developments in the field of magnetic exchange force microscopy  
*Alexander Schwarz, University of Hamburg*
- 15:15 Ferromagnetic versus antiferromagnetic tips for magnetic exchange force microscopy  
*Cesar Lazo, Carl-Albrechts-University Kiel*
- 15:30 POSTER SESSION including COFFEE BREAK  
*Chair: Ernst Meyer*
- 17:00 Bimodal atomic force microscopy: fundamentals and applications  
*Ricardo Garcia, Instituto de Microelectrónica de Madrid*
- 17:40 Higher harmonic generation in amplitude modulation AFM  
*Elena T. Herruzo, Instituto de Microelectrónica de Madrid*

- 17:55      Dynamic force spectroscopy of single chain-like molecules  
*Daniel Ebeling, University of Twente*
- 18:10      The physics of TREC imaging  
*Johannes Preiner, Johannes Kepler University of Linz*
- 18:30      shuttle bus from the KIT Campus North to Campus South
- 19:00      DINNER at the Gastdozentenhaus "Heinrich Hertz"  
located at the Campus South of KIT

**Tuesday, March 2, 2010**

- 8:45      bus shuttle from the Hotel Renaissance Karlsruhe to the KIT Campus North
- Chair: Regina Hoffmann*
- 9:30      Mechanisms of atomic friction  
*Ernst Meyer, University of Basel*
- 10:10      Dynamics of sliding friction for nanoscale contacts  
*André Schirmeisen, University of Münster*
- 10:50      COFFEE BREAK
- Chair: Yossi Rosenwaks*
- 11:20      Microscopic friction on metal surfaces  
*Nitya Nand Gosvami, Leibniz Institute for New Materials, Saarbrücken*
- 11:35      - To be announced –  
*Mark Lantz, IBM Research Zurich*
- 12:15      LUNCH
- Chair: André Schirmeisen*
- 13:15      Nano-scale measurements of dopants and traps in individual Silicon nanowires  
using Kelvin probe force microscopy  
*Yossi Rosenwaks, Tel-Aviv University*
- 13:45      Kelvin-probe force microscopy  
*Peter Milde, Technische Universität Dresden*

- 14:00      Frequency vs. amplitude modulation detection in ambient lift-mode Kelvin probe force microscopy  
*Dominik Ziegler, ETH Zürich*
- 14:15      Contrast inversion of h-BN nanomesh on Rh(111) analyzed by KPFM and bimodal nc-AFM  
*Sascha Koch, University of Basel*
- 14:30      Adhesion force measurements across the insulator-metal transition in Magnéli type vanadium oxide compounds  
*Bert Stegemann, University of Applied Sciences (HTW), Berlin*
- 14:45      Quantitative nanomechanical mapping  
*Harmut Stadler, Veeco Instruments GmbH*
- 15:00      CLOSING REMARKS
- 15:05      COFFEE BREAK & DISCUSSIONS
- 15:15      Guided lab tours through INT and IMT
- 16:00      shuttle bus to Karlsruhe Hauptbahnhof (main station)





Forschungszentrum Karlsruhe  
in der Helmholtz-Gemeinschaft

## WLAN for Guests

Before you can use the WLAN Infrastructure of the FZK

- turn on the **personal firewall** on your client-computer / notebook.
- The SSID "VPN/WEB" is automatically broadcasted to you.
- Choose **SSID "VPN/WEB"** from your WLAN-Adapter properties.
- turn **WEP or WPA encryption off**.
- edit the **TCP/IP properties of your WLAN-Client-Adapter** to get an IP-Address via DHCP.
- start your **web browser and insert a valid web address in the address field**.

You will automatically be redirected to our Authentication Server.

The following screen appears:

<p><b>Wenn Sie bereits einen Gast-Account besitzen:</b> <b>If you already received a guest account:</b></p> <p>Benutzername: <input type="text"/></p> <p>Username: <input type="text"/></p> <p>Passwort: <input type="password"/></p> <p>Password: <input type="password"/></p> <p><input type="button" value="WLAN starten / Start WLAN"/></p>	<p><b>Wenn Sie noch keinen Gast-Account besitzen:</b> <b>If you do not have a guest account:</b></p> <p>Bitte Veranstaltung wählen: Please select your event: <input type="text" value="Gaste FZK KW 9+10 (25.02.2005-14.03.2005)"/></p> <p>Passwort: <input type="password"/></p> <p>Password: <input type="password"/></p> <p><input type="button" value="Anmelden / Login"/></p>
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In the right field, choose an event. Ask your host for the right password for that event.

Insert the password in the right field "Password".

Now click on "Anmelden/Login". The following screen appears:

<p><b>Wenn Sie bereits einen Gast-Account besitzen:</b> <b>If you already received a guest account:</b></p> <p>Benutzername: <input type="text"/></p> <p>Username: <input type="text"/></p> <p>Passwort: <input type="password"/></p> <p>Password: <input type="password"/></p> <p><input type="button" value="WLAN starten / Start WLAN"/></p>	<p><b>Wenn Sie noch keinen Gast-Account besitzen:</b> <b>If you do not have a guest account:</b></p> <p>Für folgende Veranstaltung können Sie sich einen Gastaccount erstellen. You can create a guest account for the following event Gaste FZK KW 9+10</p> <hr/> <p>Vor- und Nachname: <input type="text"/></p> <p>Full Name: <input type="text"/></p> <p>Institution/Firma: <input type="text"/></p> <p>Institute/Company: <input type="text"/></p> <p>Email: <input type="text"/></p> <p><input type="button" value="Account erstellen / Create account"/></p>
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In the right field, for selfauthentication insert

- your full name
- your company or the host institute
- your email address

Then click on "Account erstellen / Create account".

The following screen appears:

## Forschungszentrum Karlsruhe

### Gästezugang für Wireless LAN

### Guest access for Wireless LAN

Es wurde ein neuer Benutzer-Account erstellt!  
A new account has been created.

Bitte merken Sie sich diese Angaben:  
Please record your account data:

Benutzername/Username:  
**testtester**

Passwort/Password:  
**pwkgkids**

### WLAN Gast-Zugang starten

### Start WLAN guest access

Hier können Sie direkt ins Internet starten.  
You can start the Internet access here.

Benutzername:   
Username:

Passwort:   
Password:

You can start surfing in the Internet with a click on "WLAN starten / Start WLAN".

#### Security:

The authentication process is encrypted.

The following data transmission via WLAN is NOT encrypted!

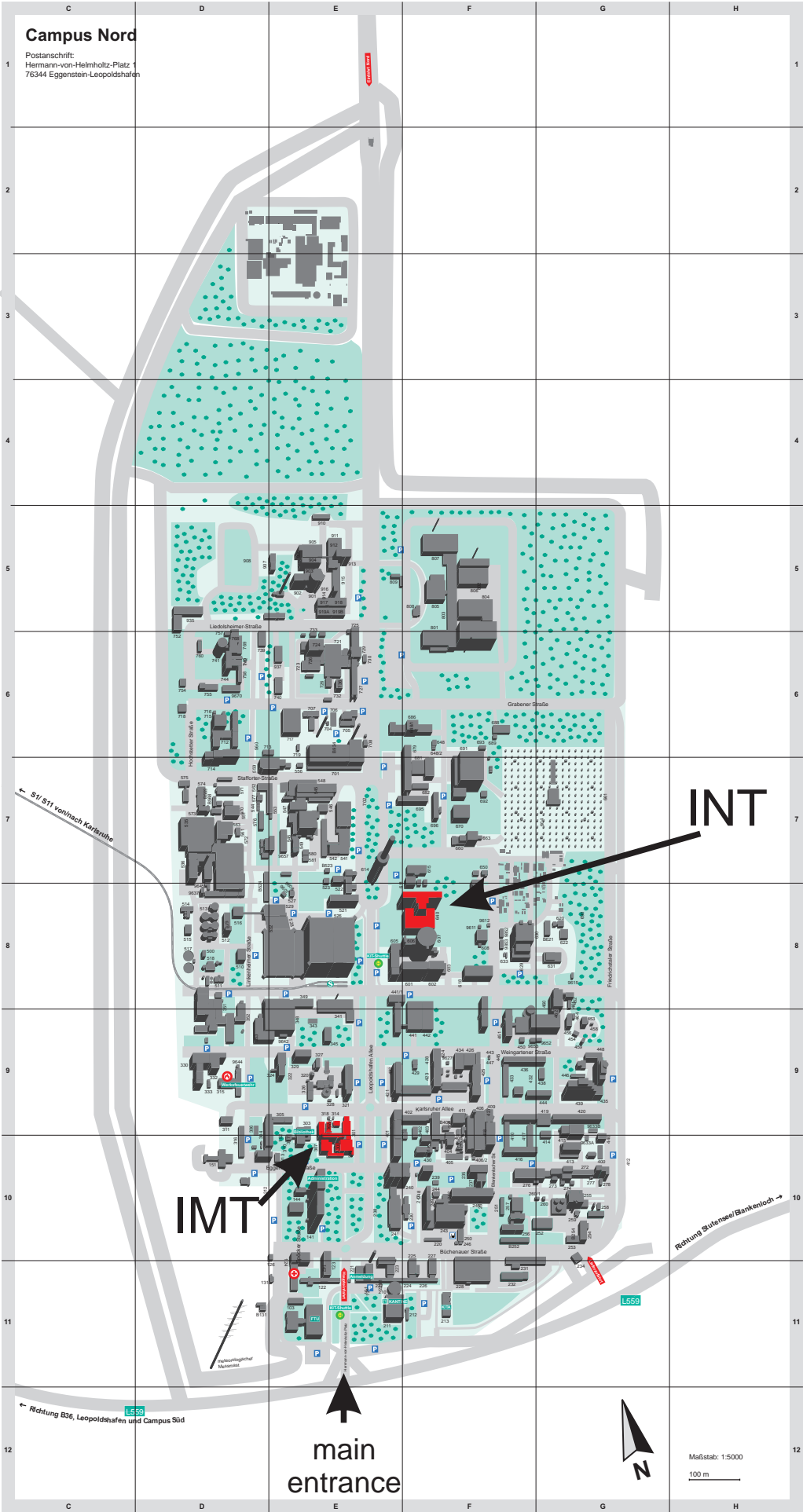
The WLAN network in the FZK is a VLAN which leads directly to the Internet.

You should turn on the personal firewall and the antivirus software on your Notebook / PC!

Have fun!

Your WLAN Team

wlan@iwr.fzk.de



# Campus Süd

Gastdozentenhaus  
Heinrich Hertz



entrance by car

Renaissance Karlsruhe Hotel