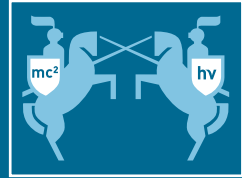


**IYPT
2012**

**20.–29.07.
BAD SAULGAU
GERMANY**



25th International Young Physicists' Tournament

The Physics World Cup



Under the auspices of the German Physical Society

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Greetings

Dear All,

In 1988 Ronald Reagan was President of the United States and perestroika (a program of economic restructuring) was initiated by Premier Mikhail Gorbachev in the Soviet Union. The Olympics were held in Seoul and the world-wide-web, an idea of Tim Berners-Lee while working at CERN, was still three years away from reality.



Twenty-five years ago Evgeny Yunosov and our friends from Russia came up with an incredible idea, the first International Young Physicists' Tournament, a competition to foster scientific research and improved international communication in Physics, a development from their internal Young Physicists' Tournament. It is an idea that required students to talk physics in "physics fights".

When Germany first hosted IYPT in 1998, with the participation of the teams from Australia and Mexico, it was the first time nations outside Europe were represented. That was my first experience of IYPT and the start of an obsession that has created a revolution in my approach to physics teaching. Inquiry based learning had often been promoted as the approach to engage students with science but many studies had also shown that its introduction to the classroom had been far from effective. Discovering IYPT led to the realisation that the competition provides a physics teacher with a perfect vehicle to introduce more inquiry based learning into the classroom.

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The seventeen problems that form the basis of each tournament have been carefully selected to provide open-ended tasks. A competition where students need to present research and defend their findings against the opposition of their peers cannot have simple well-defined answers or discussion becomes meaningless. The tasks encourage the students to interpret the problem and investigate the elements they consider important. The student takes ownership of the task and will spend many weeks or months trying to produce a solution. The students research to find new knowledge in the knowledge that they will need to discuss their findings in physics fights at the competition means they must work in a disciplined way.

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The incredible idea of the physics fight is the key to the success of IYPT as a competition and as an educational experience. I love working with my students while they try to find solutions to these complex problems but I also know that I speak for all the jurors when I say we return year after year to see students talking physics. And enjoying it!

International friendships that span the globe are forged in the middle of these fights and we see former competitors regularly returning as everything from helper to Executive Committee Member. They know the value of this experience!

The 25th IYPT is an important milestone for the competition and gives us opportunity to reflect on how far this idea has spread. In 2012, this beautiful host town of Bad Saulgau and the welcome of the Local Organising Committee and the local people promise a wonderful opportunity to celebrate a quarter century of talking physics at IYPT. We return to Germany and we see a tournament with nearly double the countries that were present in Donaueschingen in 1998 and many others here as observers with plans to join the IYPT family in the coming years.

I hope that you thoroughly enjoy your week in Bad Saulgau. Embrace the atmosphere, talk some physics and watch others do so in competition. Celebrate the 25th International Young Physicists' Tournament with us!

Alan Allinson

President of the International Young Physicists' Tournament

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Dear IYPT Friends,

“The important thing is not to stop questioning.” This quote by Albert Einstein is ideally suited to the IYPT, because only those who do not stop questioning will be successful in this competition.

I first became acquainted with the IYPT in Spala, Poland 17 years ago and caught the bug immediately. A small, closely knit group of student teams had come to present and discuss the results of their research in so-called physics fights. It very quickly became clear to me that the IYPT is an extraordinarily valuable platform for problem solvers. And they are exactly the ones our technology oriented enterprises are looking for. A good education consists not only of technical knowledge, but also creativity. At the IYPT the young people experience all the phases of research: intensive literature search, conversations with experts from research institutes and industry, development of theoretical models, computer simulations and testing by means of experiments.

In the meantime the small IYPT family has turned into a physics competition for young people which has become respected the world over. I am very proud and happy that towards the end of my active teaching career I have the privilege of seeing the IYPT as a guest in Germany. I am convinced that the IYPT fever will also spread here and that soon there will be a round of German Young Physicists' Tournaments (GYPT). For one thing, more young people will gain the opportunity to apply for the IYPT team, and



secondly, they will be able to discover how exciting physics can be once they get involved in it.

The Schülerforschungszentrum Südwestfalen (The Student Research Center South Westfalen) is essentially based on physics in the IYPT tradition, and as such the predestined local organizer for this year's tournament in Germany. The SFZ would never be able to organize this international competition alone. Many helping hands are giving their support to carry out the IYPT here in Bad Saulgau, whether financially, with ideas or with practical help. Dr. Meuther, Chairman of the SFZ Board of Trustees and his team have been tirelessly planning and preparing the event for months in order to offer all of the IYPT teams and guests from around the world an appealing and exciting tournament. In addition to the physics fights the young physicists and those accompanying them will have the opportunity to get to know the people and the country as well as to have a look at world renowned companies in the region.

But the IYPT 2012 is also a place for friendship between the young people of the many participating countries.

I would like to wish all the visitors to the IYPT 2012 an exciting and memorable stay in Bad Saulgau and the other regions in Baden-Württemberg.

Rudolf Lehn
Chair of the LOC

Bad Saulgau, 20.–29. Juli

Investments in science, education and research are the key to progress and innovation. They provide prosperity and a future for countries with few natural resources. The region surrounding Bad Saulgau in Baden-Württemberg, where this year's International Young Physicists' Tournament (IYPT) is taking place, recognized this fact early on. Today, it is one of Germany's centres of science and industry.



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Teams of young physicists from nearly 30 nations will be working and conducting research during IYPT 2012 to tackle challenges in the field of physics. To all participants: Welcome to Germany! May you enjoy an exciting competition and taking on the tasks that lie ahead in the upcoming days.

I am glad about your passion for physics and your desire to cooperate on research with other young people. I hope that IYPT provides you the opportunity to build international friendships that will last a lifetime.

Prof. Dr. Annette Schavan
Federal Minister of Education and Research

Dear Participants
Dear Guests

37° 34' N, 126° 59' E; 43° 30' 58" N, 16° 14' 59" E;
39° 8' N, 117° 11' E; 48° 12' N, 6° 22' E; 35° 42' N,
51° 25' E... 48° 1' N, 9° 30' E, or in other
words after Seoul, Trogir, Tianjin, Vienna,
and Teheran, Bad Saulgau is the venue for
the 2012 IYPT.



We owe this to the Schülerforschungszentrum
Südwestfalen (SFZ) whose center
is here in Bad Saulgau. Their outstanding work and excellent success have
brought the IYPT 2012 here to the heart of Upper Swabia.

I hope the IYPT 2012 will be a fantastic event not only for the participants,
but for those accompanying the teams and guests as well. I would like to
take this opportunity to express my thanks to the SFZ organizational team
for planning and preparing this competition.

I would like to welcome all of you to Bad Saulgau and wish you an unfor-
gettable stay, and the participants the best of luck for the competition. I
am certain that you, the participants, in spite of, or perhaps because of the
enormously challenging problems set to you will be able to prove untrue
a statement made by the German mathematician and theoretical physi-
cist, David Hilbert, that "Modern physics is much too difficult for physicists."

Doris Schröter
Mayor of Bad Saulgau

Dear Participants,

The International Young Physicists' Tournament (IYPT) is an outstanding physics event which we are happy to host in Germany this year. The DPG is delighted to be the patron of this year's IYPT.

The tournament comprises the solution of challenging and complex scientific questions by the student participants. The problems posed sometimes bring even well-established scientists to ponder. The presentation and defense of the results in so called "Physics Fights" are then a further challenge. Typically, all attendees will demonstrate their impressive skills during the tournament. And that is enhanced by great enthusiasm for physics. Conversely, for you participation in the tournament also means gaining experience and acquiring skills that may be of great benefit to you in the future.

Therefore I would like to express my cordial thanks to the organizers of the IYPT. The IYPT helps to create excellently trained and motivated young people, who will be the key drivers of a knowledge-based society. By showing the excitement of physics and arousing curiosity we can hopefully interest graduating high school students to study physics at colleges and universities worldwide. And this choice of subject of study will pay off later,



because with a physics degree, the prospects in the labor market remain promising and offer a wide range of job opportunities. By being here you have already demonstrated your talent for and interest in science in general and physics specifically. I can warmly recommend that you consider physics as a professional career path.

I wish all of you a successful tournament and that you may never lose your fascination for physics!

Prof. Dr. Johanna Stachel
President of the German Physical Society

Town

Bad Saulgau – Located in the heart of Upper Swabia between the Danube and Lake Constance. Elevation 587 meters above sea level. Population 17,500 including its 13 incorporated villages.

The main venues of the IYPT 2012 will be the Toin Gakuen School as well as the Stadtforum. The town center is within easy walking distance from both locations. After a few minutes' walk you'll be in the middle of town standing on the historical marketplace surrounded by its half-timbered houses. Bad Saulgau provides not only excellent



shopping, but also an outstanding range of culinary offerings ranging from traditional Swabian specialties to top continental cuisine. The town also offers great architectural diversity. The office buildings both completed and near completion at the other end of the pedestrian zone demonstrate that Bad Saulgau is not only the biggest town in the county of Sigmaringen, but also is among the most important business locations in Upper Swabia.

Many companies have grown here thanks to their excellent products and they hold their own by international comparison. The focal point of the commercial and industrial infrastructure lies in the metal working industry and mechanical and plant engineering. Furthermore, there are highly specialized companies in aluminum machining, steel and sheet metal processing as well as production of electro technical fittings.

A second economic factor which has flourished in the last two and a half decades is the health and tourism sector. In 1977 the most abundant sulphureous thermal spring in Baden-Wuerttemberg was tapped in Bad Saulgau. At a temperature of 41°C 1.5 million liters of water bubble up out of a depth of 646 meters. After a few years of making do with a temporary spa, the Sonnenhof-Therme Bad Saulgau opened its doors in 1984 as the first of its kind in Upper Swabia. In February 2011 The thermal spa welcomed its ten millionth visitor. In the meantime four special clinics with reputations beyond regional borders have opened here.



The municipal art gallery Die Fähre, inseparably linked with 20th century art, is also well known outside of the region. It was founded thanks to the initiative of the French occupying forces as a “Centre d’Information” which was meant to reconcile the “arch enemies”, France and Germany. With the highly symbolic name “Museum – Die Fähre”, meaning ferry, a cultural institution which included lectures, readings and gallery space, was created and soon gained prominence in the region and beyond. Exhibitions include those of various parts of its own collection as well as of temporary collections in the cloister of the culture center “Altes Kloster”. In addition to the Fähre, a municipal theater, cabaret and concerts all help to make for an exceptionally exciting cultural life in Bad Saulgau.

Just a few months ago Bad Saulgau was able to land a major coup. In the nationally biggest and most important ecological competition “National Capital of Biodiversity” Bad Saulgau left all its competitors in Baden Wuerttemberg behind and won first place. Even cities which had Europe-wide ecological leading positions placed behind Bad Saulgau.



EC, IOC & LOC Members

EC Members	Position
Alan Allinson	President
Martin Plesch	Secretary General
John Balcombe	Treasurer
Georg Hofferek	Member
Li Chuan Yong	Member
Rudolf Lehn	Member
Dina Izadi	Member







IOC Members	Country
Alan Allinson	Australia
Dieter Winkler	Austria
Ivan Antsipau	Belarus
Victor Ando	Brazil
Assen Kyuldjiev	Bulgaria
Feng Song	China
Hsien-Chung Kao	Chinese Taipei
Kreso Zadro	Croatia
Stanislav Panos	Czech Republic
Nicolas Chevalier	France
George Laskhishvili	Georgia
Horst Bittner	Germany
Dina Izadi	Iran
Swaminathan Francisco	Kenya
Hong Jung	Korea
Gavin Jennings	New Zealand
Kingsley Imade	Nigeria







IOC Members	Country
Andrzej Nadolny	Poland
Valentin Lobyshev	Russia
Theresa Thor	Singapore
Frantisek Kundracik	Slovakia
Kim Freimann	Sweden
Samuel Byland	Switzerland
Prapun Manyum	Thailand
Valery Koleboshyn	Ukraine
John Balcombe	United Kingdom

LOC	
Rudolf Lehn, Rolf Meuther, Thomas Dannegger, Jörn Switalski,	Doris Schröter, Helmut Ruf, Eugen Kienzler, Michael Grauer

Bad Saulgau, 20.–29. Juli







Teams

Nation	Team Leader	Team Member
 AUSTRALIA	Seo, Soo Jung Zealand, Kathryn	Li, Allissa (Captain) Perrin, Laura Kim, David McMahon, Simon Zhang, Tony
 AUSTRIA	Regner, Ricky Winkler, Dieter	Diez, Gregor Diez, Matthias Freidorfer, Daniel (Captain) Kamencek, Tomas Worm, Paul
 BELARUS	Mamoika, Aliaksandr Piatrusha, Stanislau	Peregud, Yuliya (Captain) Pyzhyk, Tatsiana Khvalyuk, Anton Oleinik, Evgeniy Pastukhou, Daniil
 BRAZIL	Ibiapina, Rawlinson Medeiros Serra, Thiago Frigerio de Carvalho	Guinsberg, Liara Santiago, Bárbara Cruvinel Faria e Miranda, João Gabriel (Captain) Moreira, Guilherme Ribeiro Rebouças, Ibraim
 BULGARIA	Ivanova, Daniela Karavasilev, Nikola	Borisova, Gergana (Captain) Angelov, Tsanimir Molnar, Momchil Penchev, Ivelin Polihronov, Ivaylo
 CHINA	Song, Feng Ye, Qing	Liu, Yihan Ngai, Yingtim (Captain) Wang, Chenzhe Yao, Bowen Zhao, Wenli

Nation	Team Leader	Team Member
 CHINESE TAIPEI	Nien, Cheng-Hsun Kao, Hsien-chung	Chen, Hsueh-Hung Hsu, Young Huang, Tsung-Sheng Lin, Yen-Yu (Captain) Shyu, Yi-Hsiang
 CZECH REPUBLIC	Panosova, Dagmar Dirlbeck, Jan	Doležal, Jakub Ha Xuan, Son Le Quy, Anh Vu (Captain) Pham, Nhat Thanh Zahradnik, Tomas
 FRANCE	Chevalier, Nicolas Ravat, Cyril	Barral, Marie-Cécile Balcerac, Alexander Belluteau, Nicolas Briand, William Colin, Samuel (Captain)
 GEORGIA	Laskhishvili, George Gachechiladze, Teimuraz	Karbelashvili, Tamari Kharitonashvili, Elene Nizharadze, Tamar Barnaveli, Alexander (Captain) Kvantrishvili, Giorgi
 GERMANY	Ostermaier, Florian Miksch, Björn	Borys, Clemens Dehlwes, Lars Hege, Paul Kern, Michael (Captain) Schemmelmann, Tobias
 HUNGARY	Illy Dr., Judit Pipek, Orsolya	Bogye, Balázs Bolgár, Dániel Dálya, Gergely Galgóczi, Gábor (Captain) Kalapos, András

Bad Saulgau, 20.–29. Juli

Nation	Team Leader	Team Member
 INDONESIA	Silalahi, Alexander Tan, Jong	Datui, Albert (Captain) Sancerio, Limiardi Warsito, Indhika Winarto, Himawan Wirajaya, Samuel
 IRAN	Montazeri Namin, Mr. Reza	Anbarafshan, Miss. Rojin Azizpourlindi, Miss. Shiva Kamalhedayat, Mr. Kamran (Captain) Modarressi, Mr. Seyed Mohammadali Soheili, Mr. Amirreza
 KENYA	Swaminathan, Francisco Francisco, Devadoss winnie	Gatumbu, Paul Kabutu Panurana, Arjun Kumar Shah, Nilhar Prabadh (Captain) Shah, Sahil Anant Vohra, Saveer Singh
 KOREA	Jung, Hong Bae, GwangBin	Kim, DoYeong Kim, JeeHyun Oh, JaeWon Sohn, WuHyun Suh, HyungJu
 NETHERLANDS	Stadermann, Kirsten	Mokhov, Peter Mulder, Glenn Pops, Maarten Sarnatskiy, Andre Strijkstra, Renske
 NEW ZEALAND	Hogan, Kent	Potaka, Kaylie Fu, Howell (Captain) Harvey, Matthew Hughes, Oliver Zhang, Jesse

Nation	Team Leader	Team Member
 NIGERIA	Uno, Uno Imade, Kingsley	Akitoye, Adefunke Shehu, Saudatu Udeh, Uwakmfon Thompson, Sylvester (Captain) Uzundu, Bekuechukwu
 POLAND	Nadolny, Andrzej Gładczuk, Łukasz	Siennicka, Katarzyna Dziwulski, Mateusz Konopko, Karol Szcześniak, Jakub (Captain) Wikieł, Kacper
 RUSSIA	Inisheva, Olga Shchetnikov, Andrey	Sorochikhina, Yulia Krotov, Alexey Kurilovich, Pavel Kurilovich, Vladislav (Captain) Matyunin, Vyacheslav
 SINGAPORE	Tan, Joy Tan, Guoxian	Jee, Jee Kai Yen Lim, Lim Yong Hui Mark, Daniel Keat Kay (Captain) Pay, Shieu Ming Daryl Yeo, Jie
 SLOVAKIA	Bzdušek, Tomáš Vavřík, Boris	Součková, Kamila Badin, Matej Bodnár, Marco (Captain) Dej, Adam Hledík, Michal
 SLOVENIA	Capuder, Rok	Gosar, Žiga (Captain) Kolman, Maks Logar, Matej Romih, Gašper Domen

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Nation	Team Leader	Team Member
 SWEDEN	Ullstad, Felicia Lavröd, Jakob	Anghel, Maria Al-Nasrawi, Mustafa Pålsson, Marcus Sjövall, Fredrik Wehlin, Petter (Captain)
 SWITZERLAND	Massarek, Ilana Keller, Daniel	Glaus, Julia Lane, Margaret Lenggenhager, Patrick Meister, Patrick Schertenleib, Eric
 THAILAND	Manyum, Prapun Rakreungdet, Worawarong	Dechsakul, Pichayapron Kongkhambut, Phatthamon (Captain) Lapanunt, Aungsumalee Simakachorn, Peera Thaminkaew, Thanakorn
 UNITED KINGDOM	Adams, Steve Kirk, Martin	Brent, James Elcock, Edward Facey, Alex (Captain) Fisher, Alistair Suemanothom, Ratanon

Jury Members



Philip, O'Neill
Independent Juror

AUSTRALIA



Daniela, Ivanova
Team leader / Juror

BULGARIA



Christa, Deinlein
Independent Juror

AUSTRIA



Chuanyong, Li
EC member / Juror

CHINA



Ricky, Regner
Team leader / Juror

AUSTRIA



Xuewei, Cao
Independent Juror

CHINA



Ivan, Antsipau
Independent Juror

BELARUS



Chenghou, Tu
Independent Juror

CHINA



Assen, Kyuldjiev
EC member / Juror

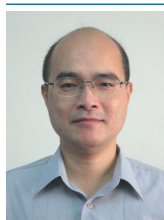
BULGARIA



Feng, Song
Team leader / Juror

CHINA

Bad Saulgau, 20.–29. Juli



Cheng-Hsun, Nien
Team leader / Juror

CHINESE TAIPEI



Zsuzsanna, Rajkovits Dr.
Independent Juror

HUNGARY



Stanislav, Panos
Independent Juror

CZECH REPUBLIC



Judit, Illy Dr.
Team leader / Juror

HUNGARY



Dagmar, Panosova
Team leader / Juror

CZECH REPUBLIC



Dr. Dina, Izadi
EC member / Juror

IRAN



Nicolas, Chevalier
Team leader / Juror

FRANCE



Francisco, Swaminathan
Team leader / Juror

KENYA



George, Laskhishvili
Team leader / Juror

GEORGIA



ByungHoon, Chung
Independent Juror

KOREA



Hong, Jung
Team leader / Juror

KOREA



Władysław, Borgiel
Independent Juror

POLAND



Prof. Park, Chan Oung
Independent Juror

KOREA



Andrzej, Nadolny
Team leader / Juror

POLAND



Gavin, Jennings
EC member / Juror

NEW ZEALAND



Valentin, Lobyshev
Independent Juror

RUSSIA



Francis, Ekwenta
Independent Juror

NIGERIA



Olga, Inisheva
Team leader / Juror

RUSSIA



Uno, Uno
Team leader / Juror





NIGERIA



Ye, Yeo
Independent Juror

SINGAPORE

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 <p>Joy, Tan Team leader / Juror</p> <p>SINGAPORE</p>	 <p>Kim, Freimann Independent Juror</p> <p>SCHWEDEN</p>
 <p>Martin, Plesch EC member / Juror</p> <p>SLOVAKIA</p>	 <p>Samuel, Byland Independent Juror</p> <p>SWITZERLAND</p>
 <p>František, Kundracik Independent Juror</p> <p>SLOVAKIA</p>	 <p>Prof. Othmar Marti Independent Juror</p> <p>SWITZERLAND</p>
 <p>Tomáš, Bzdušek Team leader / Juror</p> <p>SLOVAKIA</p>	 <p>Prof. Andreas Vaterlaus Independent Juror</p> <p>SWITZERLAND</p>
 <p>Mattias, Andersson Independent Juror</p> <p>SCHWEDEN</p>	 <p>Prof. Eugen Voit Independent Juror</p> <p>SWITZERLAND</p>



Ilya Martchenko
Independent Juror

SWITZERLAND



John, Balcombe
EC member/Juror

UNITED KINGDOM



Prap Un, Manyum
Team leader/Juror

THAILAND

Local Jurors



Horst, Bittner
Independent Juror



Prof. Rita Wodzinski
Independent Juror



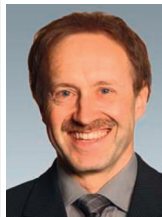
Prof. Peter Reineker
Independent Juror



Prof. Angela Foesel
Independent Juror



Karl Heller
Independent Juror



Prof. Raimund Girwidz
Independent Juror



Dr. Matthias Theis
Independent Juror



Dr. Jürgen Durst
Independent Juror



Florian, Ostermaier
Team leader / Juror



Dr. Martin Leonhard
Independent Juror



Dr. Michael Sinzinger
Independent Juror



Dr. Klaus Röller
Independent Juror



Dr. Carsten Geckeler
Independent Juror



Benjamin Obert
Independent Juror



Dr. Michael Gierling
Independent Juror



Herrmann Klein
Independent Juror



Dr. Davor Stolcic
Independent Juror



Matthias Müller
Independent Juror



Patrick Kerner
Independent Juror



Fabian Bühler
Independent Juror

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Prof. David Wharam
Independent Juror



Prof. Metin Tolan
Independent Juror

Schedule

Friday, July 20

- All day Arrival and check-in of all teams
 EC meeting
- 18:00 h Swabian welcome party

Saturday, July 21

- 09:00 h Opening Ceremony at the Stadtforum in Bad Saulgau
- 11:30 h Press conference with EC, organizers and guests
 Briefing of the jurors
 Photo session for the teams
- 15:30 h Start of competition: 1st Physics Fight

Sunday, July 22

- 08:30 h 2nd Physics Fight
- 15:30h 3rd Physics Fight

Monday, July 23

- 08:30 h 4th Physics Fight
- 14:30 h Program for all tournament participants (voluntarily)

Tuesday, July 24

- 08:30 h 5th Physics Fight
- 14:30 h Program for all tournament participants (voluntarily)
- 20:00h IYPT party on the campus

Wednesday, July 25

09:00 h Final of the tournament at the Stadtforum in Bad Saulgau

13:45 h General program for all tournament participants

Thursday, July 26

08:00 h Program for all tournament participants at Lake Constance

18:30 h Awards ceremony in the Stadtforum in Bad Saulgau
followed by a get together

Friday, July 27

09:00 h Transfer to Stuttgart
Check-in at the youth hostel

11:30 h Company visit at Daimler

Evening IOC meeting

Free time for the teams

Saturday, July 28

09:00 h Daimler Museum

Free time

09:00 h IOC meeting 2

Sunday, July 29

Departure

Social activities

Optional Program for Monday, July 23, 2012 and Tuesday, July 24, 2012 (afternoons)

Guided tour through historical Bad Saulgau with the town bard

If it's an entertaining journey through Bad Saulgau's history you're looking for, then you're in good hands with the town bard. Michael Skuppin will lead you through the historic town with stories and songs accompanying himself on the medieval lute. As a time traveller strolling from the town hall to the Kreuzkapelle, you'll learn fascinating things about noble knights, high towers, phony saints and lots more.

Behind the scenes at the Fire Department

Fighting fires, technical assistance, help when traffic accidents occur, and assistance with hazardous materials are a few examples of the multifaceted tasks that the members of the fire department are involved in. As a participant in this excursion you will get an insight into the structure and diversity of tasks of the fire department. You will have the opportunity to go up into lofty heights with the aerial ladder and get a glimpse of Bad Saulgau from a bird's eye view and learn the correct method of fire extinguishing from the fire trainer.

Farmer and Energy Manager: Are they Compatible?

At the Dreher farm in the bio-energy village of Lampertsweiler you can gain interesting insights into modern farming. You will be able to see dairy farming in action on a farm with 120 cows and two milking robots. Of special interest to young physicists will be the biogas plant which produces thermal energy and electricity. The energetic treatment of renewable resources produces not only electricity, but also provides 30 households with heat. After the visit there will be an opportunity to taste a "Denneke", a Swabian "pizza". Further information about the farm at <http://www.dreher-erlebnishof.de>

Knoll.It works – An innovative machine-building company

The machine-building company, Knoll Maschinenbau GmbH, is not only one of the biggest employers in Bad Saulgau but also one of the leading suppliers of products that feed, filter and pump contaminated coolants and chips. During this visit you will get acquainted with the research and development department of an innovative, future-oriented company. You will get an impression of the modern training department where emerging talents are trained in modern occupations

such as industrial mechanic, electronic technician, product designer, and engineer. Further information about Knoll at <http://www.knollmb.de>

Up, up and away – climbing on the climbing wall of the DAV (German Alpine Association) use to

Would you like to try something different? Climb the climbing wall that the members of the German Alpine Association practice on for their climbing tours in the German and Austrian Alps. If you would like to let off a little steam after a lot of brain work during the competition and at the same time experience the fascination of climbing, then the climbing wall is the perfect place for you. Experienced instructors and all necessary safety measures ensure an interesting experience.

Baroque and nature – A walk to Convent Siessen

If you are interested in Baroque architecture as well as church and religious culture then you should not miss this opportunity. The two-kilometer walk takes us through the lovely Wiesen Valley to the convent. On the grounds of the Franciscan convent stands a jewel of Baroque architecture, St. Marcus church, built by the great architect, Dominikus Zimmermann. Apart from the church, there is also a small museum exhibiting the works of Sister Innocentia Hummel whose paintings served as models for the world famous Hummel figurines. On the grounds of the convent is also the St. Francis Garden. On the way back to Bad Saulgau the Wagenhauser Weiher (Wagenhauser Lake) invites the passers-by to a swim in warm weather. More information about Convent Siessen at <http://www.klostersiessen.de>

Fixed Program on Wednesday, July 25, 2012 (13:45 – 18:00)

A competent partner in agricultural technology – A visit to Claas

The high-horsepower tractor, Xerion, with 500hp will be presented to the IYPT team members at Claas this afternoon. In addition, you will be able to see high-tech fodder harvesters produced by Claas. Other highlights of this visit are a tour through the production department, an opportunity to take a ride on the test track, and much more. This promises to be a very interesting afternoon in view of the fact that Claas is a very successful international agricultural technology firm whose motto is "The First Mover in Agricultural Technology". Further information about Claas at <http://www.claas.de>

Sigmaringen Castle – A journey into the 11th century

The oldest parts of the castle, majestically situated above the Danube, date back to the time of the Stauffer, about 1200. During the guided tour you will experience 15 royal state rooms and learn about the history, historical connections and everyday life in the castle. The castle is well worth a visit. After the guided tour in the castle there will be a visit to the local Zollern Brewery where there will be an opportunity not only to see the brewery, but to sample the excellent beer. Further information about the castle at <http://www.schloss-sigmaringen.de>

Up, up and away II – A visit to Liebherr Ehingen

Liebherr's P-crane "Power Boom" which can lift a load of more than 1300 tons and towers 150 meters high, is one of the highlights awaiting visitors in Ehingen. The Liebherr Ehingen GmbH plant is one of the world's leading producers of mobile cranes. During the visit we will also have a look at the production of telescopic and lattice boom cranes on mobile and crawler vehicles. We will also be able to see the cranes in action. A further focus of the visit will be the training programs at Liebherr. Further information about Liebherr at <http://www.liebherr.com>

Einstein and Bad Buchau – An afternoon of archaeology, Baroque and the art of brewing beer

The moor spa town of Bad Buchau is situated in the middle of a fascinating moor landscape. It is here in Bad Buchau where Albert Einstein's parents lived before his birth. One of Einstein's descendants will give the visitors a tour on the archaeological trail about one of the most important European archaeological sites in regard to settlements. Visitors will be able to immerse themselves in the Baroque era while visiting the 18th century Baroque library hall of the monastery Bad Schussenried.

Rounding off the excursion will be a visit to the Bad Schussenrieder brewery where a master brewer will reveal the secrets of the makings of good beer. Naturally, there will be samples available.

Creating value through innovation – Research and Development at Boehringer Ingelheim

Boehringer Ingelheim is among the most research intensive pharmaceutical companies worldwide. Biotechnology and large sections of Boehringer's research activities are located at the Biberach subsidiary. Boehringer Ingelheim's pharmaceutical research is concentrated on the main therapy areas of respiratory diseases, cardiometabolic diseases, oncology, neurological diseases, immunology and infectious diseases. 7,000 highly qualified employees work worldwide in research and development on these topics.

The IYPT members who take part in this excursion will be given an overview of research activities and facilities by the staff of Boehringer Ingelheim. Further information about Boehringer Ingelheim at <http://www.boehringer-ingelheim.de>

Tuttlingen – Europe's biggest medical technology cluster

In Europe's biggest medical technology cluster 400 medical technology companies are developing innovative surgical instruments and cutting-edge implant technology. At Aesculap and Karl Storz, two of the largest and internationally successful medical technology companies, visitors will be able to get an insider's view of this innovative technology.

Among the highlights of this visit will be a look at the Aesculap Academy including the Aesculapium as well as the Karl-Storz Visitors Center where visitors can gain an insight into the world of endoscopy.

More information is available:

Karl Storz: General Information and <http://www.karlstorz.com>

Aesculap: General Information and <http://www.aesculap.com>.

Problems

1. Gaussian cannon

A sequence of identical steel balls includes a strong magnet and lies in a nonmagnetic channel. Another steel ball is rolled towards them and collides with the end ball. The ball at the opposite end of the sequence is ejected at a surprisingly high velocity. Optimize the magnet's position for the greatest effect.

2. Cutting the air

When a piece of thread (e.g., nylon) is whirled around with a small mass attached to its free end, a distinct noise is emitted. Study the origin of this noise and the relevant parameters.

3. String of beads

A long string of beads is released from a beaker by pulling a sufficiently long part of the chain over the edge of the beaker. Due to gravity the speed of the string increases. At a certain moment the string no longer touches the edge of the beaker. Investigate and explain the phenomenon.

4. Fluid bridge

If a high voltage is applied to a fluid (e.g. deionized water) in two beakers, which are in contact, a fluid bridge may be formed. Investigate the phenomenon. (High voltages must only be used under appropriate supervision – check local rules.)

5. Bright waves

Illuminate a water tank. When there are waves on the water surface, you can see bright and dark patterns on the bottom of the tank. Study the relation between the waves and the pattern.

6. Woodpecker toy

A woodpecker toy exhibits an oscillatory motion. Investigate and explain the motion of the toy.

7. Drawing pins

A drawing pin (thumbtack) floating on the surface of water near another floating object is subject to an attractive force. Investigate and explain the phenomenon. Is it possible to achieve a repulsive force by a similar mechanism?

8. Bubbles

Is it possible to float on water when there are a large number of bubbles present? Study how the buoyancy of an object depends on the presence of bubbles.

9. Magnet and coin

Place a coin vertically on a magnet. Incline the coin relative to the magnet and then release it. The coin may fall down onto the magnet or revert to its vertical position. Study and explain the coin's motion.

10. Rocking bottle

Fill a bottle with some liquid. Lay it down on a horizontal surface and give it a push. The bottle may first move forward and then oscillate before it comes to rest. Investigate the bottle's motion.

11. Flat flow

Fill a thin gap between two large transparent horizontal parallel plates with a liquid and make a little hole in the centre of one of the plates. Investigate the flow in such a cell, if a different liquid is injected through the hole.

12. Lanterns

Paper lanterns float using a candle. Design and make a lantern powered by a single tea-light that takes the shortest time (from lighting the candle) to float up a vertical height of 2.5 m. Investigate the influence of the relevant parameters. (Please take care not to create a risk of fire!)

13. Misty glass

Breathe on a cold glass surface so that water vapour condenses on it. Look at a white lamp through the misted glass and you will see coloured rings appear outside a central fuzzy white spot. Explain the phenomenon.

14. Granular splash

If a steel ball is dropped onto a bed of dry sand, a "splash" will be observed that may be followed by the ejection of a vertical column of sand. Reproduce and explain this phenomenon.

15. Frustrating golf ball

It often happens that a golf ball escapes from the hole an instant after it has been putted into it. Explain this phenomenon and investigate the conditions under which it can be observed.

16. Rising bubble

A vertical tube is filled with a viscous fluid. On the bottom of the tube, there is a large air bubble. Study the bubble rising from the bottom to the surface.

17. Ball in foam

A small, light ball is placed inside soap foam. The size of the ball should be comparable to the size of the foam bubbles. Investigate the ball's motion as a function of the relevant parameters.

The Regulations of the International

I. International Young Physicists' Tournament

The International Young Physicists' Tournament (IYPT) is a competition among teams of secondary school students in their ability to solve complicated scientific problems, to present solutions to these problems in a convincing form and to defend them in scientific discussions, called Physics Fights (PF).

II. The problems of the IYPT

The 17 problems are formulated by the International Organizing Committee (IOC) and sent to the participating countries not later than in October. These problems may be used in any competition that could lead to selection of a national team. They may be used in International tournaments that involve foreign teams not taking part in IYPT.

III. The participants of the IYPT

1. The national teams

Any invited country, as well as the host country, is represented by one team. A country can only take part in the IYPT if it is nominated and accompanied either by the country's IOC representative or by the representative of a candidate IMO.

2. The membership of the teams

A team is composed of five secondary school students. All members of the team must either be citizens of the country they represent, or be enrolled as students in a school of the country they represent. Secondary school graduates can participate in the IYPT in the year of their graduation. The participation of university students is not allowed. The LOC may allow participation of teams of four or three students. The composition of the team cannot be changed during the Tournament. The team is headed by a Captain who is the official representative of the team during the PFs.

3. The team is accompanied by one or two team leaders.

IV. The Jury

The Jury is nominated and organized by the LOC in cooperation with EC. The Jury consists of at least five members, if possible from different countries. Team leaders, at least one from each team, are included in the Jury. The team leaders cannot be members of the Jury in the PF where their teams participate and should not, if possible, grade the same team more than twice.

I Young Physicists' Tournament

V. The agenda of the IYPT

The IYPT is carried out in a period determined by the LOC (from May to July). All teams participate in five Selective PFs. Selective PFs are carried out according to a fixed schedule as detailed in the attachment to these Regulations. Numbers are ascribed to teams by lot. The best teams participate in the Final PF. The host country provides a cultural program for the participants.

VI. The Physics Fight regulations

Three or four teams participate in a PF, depending on the total number of teams. In the course of a PF the members of a team communicate only with each other. Before the beginning of a PF, the Jury and the teams are introduced. The PF is carried out in three (or four) Stages. In each Stage, a team plays one of the three (four) roles: Reporter, Opponent, Reviewer (Observer). In the subsequent Stages of the PF, the teams change their roles according to the schemes:

Three teams PF

Team	Stage 1	2	3
1	Rep	Rev	Opp
2	Opp	Rep	Rev
3	Rev	Opp	Rep

Four teams PF

Team	Stage 1	2	3	4
1	Rep	Obs	Rev	Opp
2	Opp	Rep	Obs	Rev
3	Rev	Opp	Rep	Obs
4	Obs	Rev	Opp	Rep

VII. The Stage regulations

The performance order in the Stage of a PF: Reserved time in minutes

The Opponent challenges the Reporter for the problem	1
The Reporter accepts or rejects the challenge.....	1
Preparation of the Reporter.....	5
Presentation of the report	12
Questions of the Opponent to the Reporter and answers of the Reporter	2
Preparation of the Opponent	3
The Opponent takes the floor, maximum 4 min. and discussion between the Reporter and the Opponent.....	14
The Opponent summarizes the discussion.....	1

Questions of the Reviewer to the Reporter and the Opponent and answers to the questions.....	3
Preparation of the Reviewer	2
The Reviewer takes the floor.....	4
Concluding remarks of the Reporter	2
Questions of the Jury	5

In the Final PF the procedure of challenge is omitted.
The official language of the IYPT is English.

VIII. The team performance in the Stages

The Reporter presents the essence of the solution to the problem, attracting the attention of the audience to the main physical ideas and conclusions.

The Opponent puts questions to the Reporter and criticizes the report, pointing to possible inaccuracy and errors in the understanding of the problem and in the solution. The Opponent analyses the advantages and drawbacks of both the solution and the presentation of the Reporter. The discussion of the Opponent should not become a presentation of his/her own solution. In the discussion, the solution presented by the Reporter is discussed.

The Reviewer presents a short estimation of the presentations of Reporter and Opponent.

The Observer does not participate actively in the PF.

During one PF only one member of a team takes the floor as Reporter, Opponent or Reviewer; other members of the team are allowed to make brief remarks or to help with the presentation technically. No member of a team may take the floor more than twice during one Selective PF or, as Reporter, more than three times in total during all Selective PFs. During the Final PF any team member can take the floor only once.

The LOC must inform about the devices available for presentations not later than two months before the IYPT.

IX. The rules of problem-challenge and rejection

1. All problems presented in the same PF must be different.

2. *Selective PF*

The Opponent may challenge the Reporter on any problem with the exception for a problem that:

- a) was rejected by the Reporter earlier;
- b) was presented by the Reporter earlier;
- c) was opposed by the Opponent earlier;
- d) was presented by the Opponent earlier.

If there are less than five problems left to challenge, the bans d), c), b), a) are successively removed, in that order.

During the Selective PFs the Reporter may reject the challenge of three different problems in total without penalty. For every subsequent rejection the coefficient of the Reporter (see section X) is decreased by 0.2. This reduction continues to apply during the following selective PFs.

3. *Final PF*

Within four hours after the announcement of the results of the Selective PFs the teams participating in the Final choose their problems. In case teams choose the same problem, priority is given according to the order of presentation in the Final (see section XII). The choice should be made public immediately.

X. The grading

After each stage the Jury grades the teams, taking into account all presentations of the members of the team, questions and answers to the questions, and participation in the discussion. Each Jury member shows integer marks from 1 to 10. The mean of the highest and the lowest marks is counted as one mark which is then added to the remaining marks. This sum is used to calculate the mean mark for the team. The mean marks are multiplied by various coefficients: 3.0 or less (see section IX) for the Reporter, 2.0 for the Opponent, 1.0 for the Reviewer and then transformed into points.

XI. The resulting parameters

1. *For a team in the PF*

The sum of points (SP) is the sum of mean marks, multiplied by the corresponding coefficients and rounded to one decimal.

2. *For a team in the Tournament*

The total sum of points (*TSP*) equals the sum of *SP* of the team in all Selective PFs. The number of fights won (FW) is the number of Selective PFs, in which a team received the highest SP from all three or four teams participating in the same PFs.

XII. The Final

The three teams having the highest *TSP* in the Selective PFs participate in the Final. In case teams have equal *TSP*, their participation in the Final is decided by FW. If team(s) winning all their Selective PFs (FW=5) did not reach the Final by *TSP*, the best of them (determined by *TSP*) takes part in the final as fourth team.

The order of presentation in the Final is determined by position by entering the final: the higher the *position*, the lower the number in the scheme of section VI.

XIII. The final team ranking of the IYPT

Students in the top half (rounded up) of participating teams receive medals. The students of the team winning the Final are awarded the winners' cup. If two or three teams have the same *SP* result in the Final, the winner is nominated according to the highest *TSP*, in case of equality by FW. All teams participating in the final are awarded 1st place certificates and gold medals. The five best teams not participating in the final are awarded 2nd place certificates and silver medals. 3rd place certificates and bronze medals are awarded to students in all other teams finishing in the top half. All other students receive certificates of participation. Team leaders obtain certificates indicating the ranking of their team.

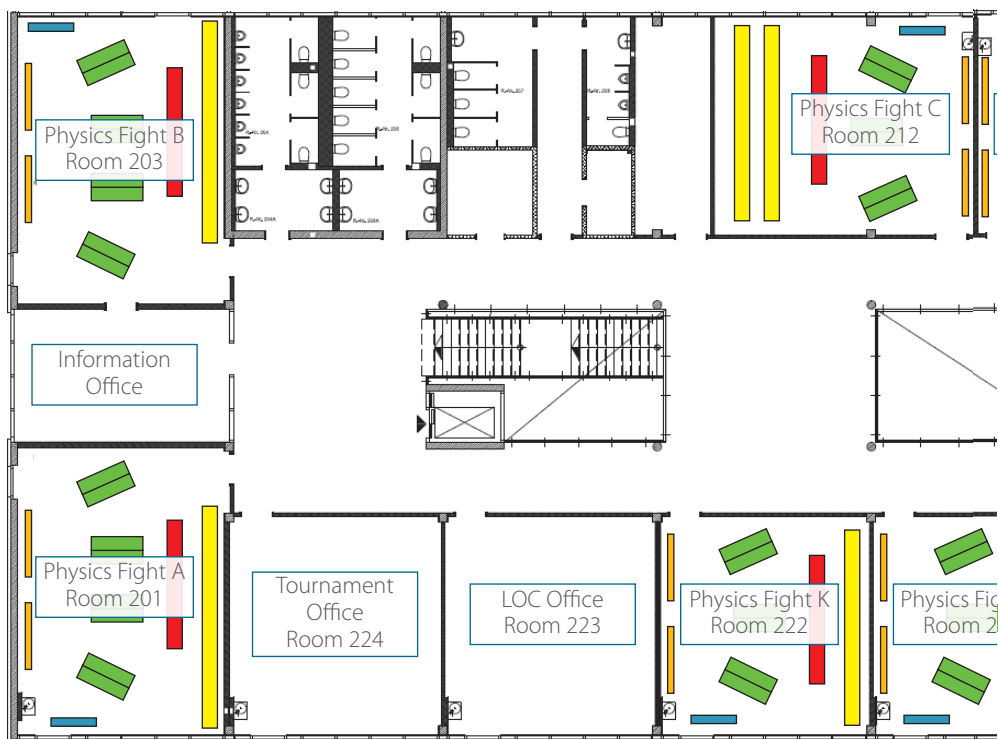
XIV. The status of the regulations of the IYPT

The regulations are established by the IOC and may be changed only by the IOC.

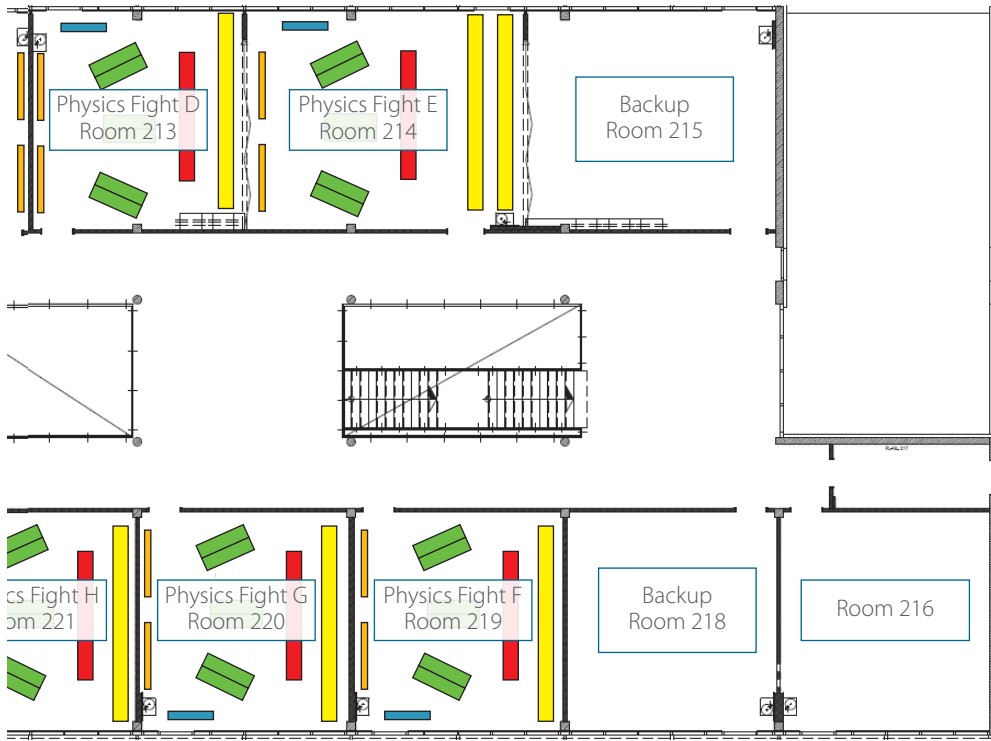
Accepted in Isfahan on 2011-07-30



Map of the Fight Rooms (second Floor – 1)

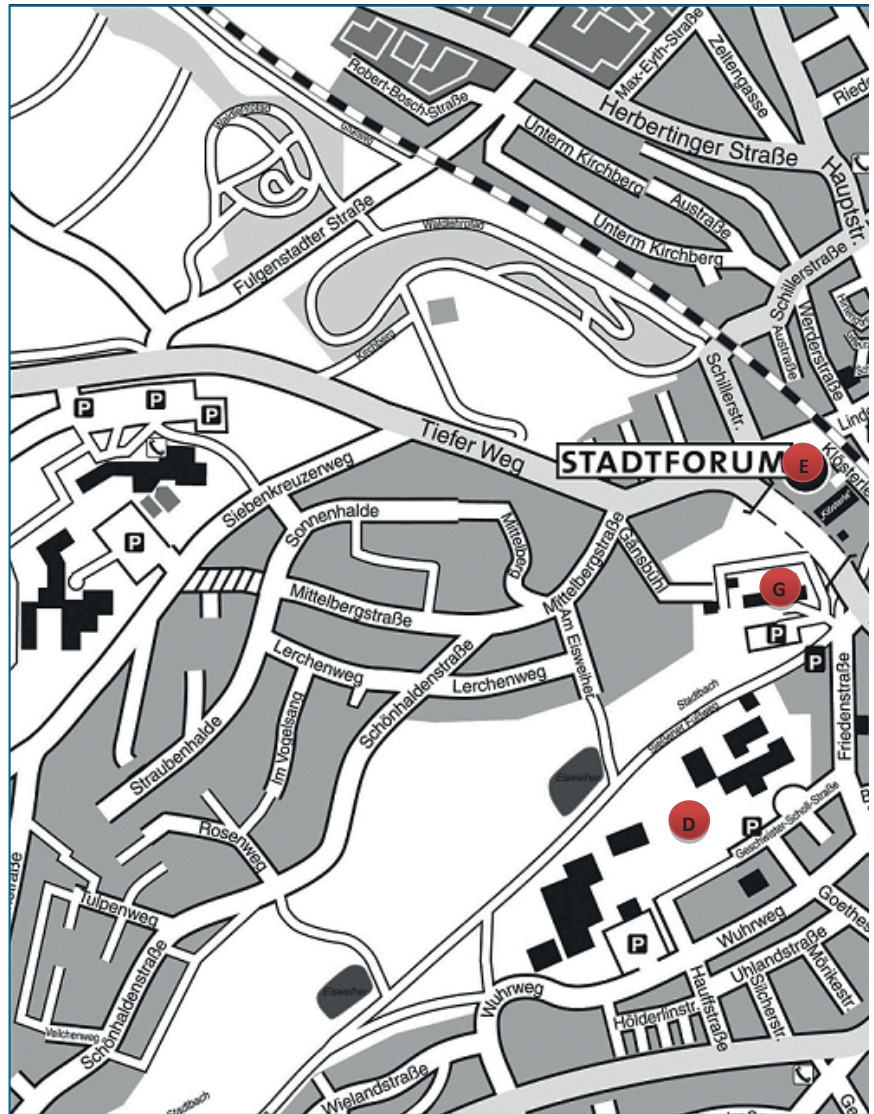


– Kaufmännische Schule)



Bad Saulgau, 20.–29. Juli

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A – Campus
B – Kronriedhalle
C – Internat
D – Kaufm. Schule

E – Stadtforum
F – Antonius Apotheke
G – Hospital
H – Hotel Kleber Post



- I – Hotel Württemberger Hof
- J – Hotel Ochsen
- K – Hotel Schwarzer Adler

Impressum

Local Organizing Committee 25th IYPT 2012

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