

Global Astronomy Survey: Germany

First submission: Michael Geffert (SPoC) [see human resources section] 18 July 2009

SPoC Approval: Yes

PROFESSIONAL (RESEARCH ASTRONOMY):

I) Universities offering Astronomy:

20 universities in Germany offer different lectures in astronomy:

Berlin: Technische Universität Berlin

Bochum: Ruhr-Universität Bochum

Bonn: Rheinische Friedrich-Wilhelms-Universität Bonn

Bremen: Jacobs University Bremen

Dresden: Technische Universität Dresden

Erlangen-Nürnberg: Friedrich-Alexander-Universität Erlangen-Nürnberg

Frankfurt am Main: Johann Wolfgang Goethe-Universität Frankfurt am Main

Freiburg: Albert-Ludwigs-Universität Freiburg

Göttingen: Georg-August-Universität Göttingen

Hamburg: Universität Hamburg

Hannover: Leibniz Universität Hannover

Heidelberg: Ruprecht-Karls-Universität Heidelberg

Jena: Friedrich-Schiller-Universität Jena

Kiel: Christian-Albrechts-Universität zu Kiel

Köln: Universität zu Köln

Garching (bei München): Technische Universität München

München: Ludwig-Maximilians-Universität

Potsdam: Universität Potsdam

Tübingen: Eberhard Karls Universität Tübingen

Würzburg: Julius-Maximilians-Universität Würzburg

II) Universities offering Physics:

94 universities in Germany offer different lectures in physics

Aachen: Rheinisch-Westfälisch Technische Hochschule (RWTH) Aachen

Aalen: Hochschule Aalen Technik und Wirtschaft

Augsburg: Universität Augsburg

Bayreuth: Universität Bayreuth

Berlin: Freie Universität Berlin

Berlin: Humboldt-Universität zu Berlin

Berlin: Technische Universität Berlin

Bielefeld: Universität Bielefeld

Birkenfeld: Fachhochschule Trier - Hochschule für Technik, Wirtschaft und Gestaltung
University of Applied

Sciences

Bochum: Ruhr-Universität Bochum

Bonn: Rheinische Friedrich-Wilhelms-Universität

Braunschweig: Technische Universität Carolo-Wilhelmina zu Braunschweig

Bremen: Jacobs University Bremen

Bremen: Hochschule Bremen

Chemnitz: Technische Universität Chemnitz

Clausthal-Zellerfeld: Technische Universität Clausthal

Coburg: Hochschule für angewandte Wissenschaften Fachhochschule Coburg

Coburg: Fachhochschule Schloss Hohenfels Staatlich anerkannte private Hochschule für Fachtherapien im Gesundheitswesen

Cottbus: Brandenburgische technische Universität Cottbus

Darmstadt: Technische Universität Darmstadt

Deggendorf: Hochschule Deggendorf University of Applied Sciences

Dortmund: Technische Universität Dortmund

Dresden: Technische Universität Dresden

Duisburg: Universität Duisburg-Essen

Düsseldorf: Heinrich-Heine-Universität Düsseldorf

Emden: Fachhochschule Oldenburg / Ostfriesland / Wilhelmshaven

Erlangen-Nürnberg: Friedrich-Alexander-Universität Erlangen-Nürnberg

Essen: Universität Duisburg-Essen

Flensburg: Universität Flensburg

Frankfurt am Main: Johann Wolfgang-Goethe Universität Frankfurt am Main

Freiberg: Technische Universität Bergakademie Freiberg

Freiburg: Albert-Ludwigs-Universität Freiburg

Friedberg: Fachhochschule Gießen-Friedberg

Gelsenkirchen: Fachhochschule Gelsenkirchen

Gießen: Justus-Liebig-Universität Gießen

Göttingen: Fachhochschule Hildesheim/Holzminden/Göttingen Hochschule für angewandte Wissenschaft und

Kunst

Göttingen: Georg-August-Universität Göttingen

Greifswald: Ernst-Moritz-Arndt-Universität Greifswald

Halle: Martin-Luther-Universität-Halle-Wittenberg

Hamburg: Universität Hamburg

Hannover: Leibniz Universität Hannover

Heidelberg: Pädagogische Hochschule Heidelberg

Heidelberg: Ruprecht-Karls-Universität Heidelberg

Hildesheim: Universität Hildesheim

Ilmenau: Technische Universität Ilmenau

Iserlohn: Fachhochschule Südwestfalen Hochschule für Technik und Wirtschaft

Isny: Naturwissenschaftlich-Technische Akademie Prof. Dr. Grübler gemeinnützige GmbH Hochschule und

Berufskollegs

Jena: Fachhochschule Jena University of Applied Sciences

Jena: Friedrich-Schiller-Universität Jena

Jülich: Fachhochschule Aachen

Kaiserslautern: Technische Universität Kaiserslautern

Karlsruhe: Pädagogische Hochschule Karlsruhe University of Education

Karlsruhe: Universität Friedericiana zu Karlsruhe (TH) Forschungsuniversität (gegründet 1825)

Kassel: Universität Kassel

Kiel: Christian-Albrechts-Universität zu Kiel

Koblenz: Universität Koblenz-Landau, Abteilung Koblenz

Köln: Universität zu Köln

Konstanz: Universität Konstanz

Landau: Universität Koblenz-Landau, Abteilung Landau

Leipzig: Universität Leipzig

Ludwigsburg: Pädagogische Hochschule Ludwigsburg

Lüneburg: Leuphana Universität Lüneburg

Magdenburg: Otto-von-Guericke-Universität Magdeburg

Mainz: Johannes Gutenberg-Universität Mainz

Marburg: Philipps-Universität Marburg

Merseburg: Hochschule Merseburg (FH) University of Applied Sciences

Mittweida: Hochschule Mittweida University of Applied Sciences

Garching (bei München): Technische Universität München

München: Hochschule für angewandte Wissenschaften FH München

München: Ludwig-Maximilians-Universität München

Münster: Westfälische Wilhelms-Universität Münster

Nürnberg: Friedrich-Alexander-Universität Nürnberg

Nürnberg: Georg-Simon-Ohm-Hochschule Nürnberg University of Applied Sciences

Oldenburg: Carl von Ossietzky Universität Oldenburg

Osnabrück: Universität Osnabrück

Paderborn: Universität Paderborn

Potsdam: Universität Potsdam

Regensburg: Universität Regensburg

Remagen: Fachhochschule Koblenz

Rostock: Universität Rostock

Rüsselsheim: Fachhochschule Wiesbaden University of Applied Sciences

Saarbrücken: Universität des Saarlandes

Schwäbisch Gmünd: Pädagogische Hochschule Schwäbisch Gmünd

Siegen: Universität Siegen

Steinfurt: Fachhochschule Münster University of Applied Sciences

Stuttgart: Universität Stuttgart

Tübingen: Eberhard-Karls-Universität Tübingen

Ulm: Universität Ulm

Weimar: Bauhaus-Universität-Weimar

Weingarten: Hochschule Ravensburg-Weingarten Technik Wirtschaft Sozialwesen

Wildau: Technische Fachhochschule Wildau

Würzburg: Bayerische Julius-Maximilians-Universität Würzburg

Wuppertal: Bergische Universität Wuppertal

Zwickau: Westsächsische Hochschule Zwickau

III) Number of academics who have been trained in astronomy:

The “Deutsche Forschungsgemeinschaft” published in 2003 the “Denkschrift”

(<http://www.astro.uni-bonn.de/~rds/denkrds.html>)

about the status and future of astronomy in Germany from 2003 to 2016.

According to this report we had 2003 in Germany in astronomy (university and other institutions):

- 97 professors
- 375 scientists on permanent positions (at least with a PhD)
- 202 scientists on time limited positions (with a PhD)
- 409 students writing a PhD
- 215 students writing a diploma thesis with an astronomical topic

IV) □ Number of astronomical facilities

Optical Observatories:

□ □

In Germany the weather conditions are not very suited for professional astronomical observations. Most astronomers use for professional

observations international observatories (e.g. ESO)

- The largest optical observatory located within Germany is the Thüringer Landessternwarte Tautenburg with a 2m multifunctional telescope (<http://www.tls-tautenburg.de/>)
- At Wendelstein observatory a new 2m telescope is going to be installed and will work probably from 2010 (<http://www.wendelstein-observatorium.de:8002/>)
- Another professional observatory is Observatorium Hoher List with a 1m Cassegrain telescope established in 1966 (http://www.astro.uni-bonn.de/~webaiub/german/institute_hoher_list.php)
- Some of the other institutes have smaller telescopes, but these are used mainly for public outreach and student work (see professional institutions in Germany: <http://www.rat-deutscher-sternwarten.de/>)

To the Max-Planck Institut für Astronomie in Heidelberg belongs an external observatory in Spain: The Calar

Alto observatory (<http://www.caha.es/index.php?lang=de>) with a 3.5m, a 2.2m and a 1.23m telescope.

Radio Telescopes:

□□□ With the 100m radio telescope in Effelsberg, one of the largest radio telescopes in the world is located in

Germany (<http://www.mpifr-bonn.mpg.de/div/effelsberg/>). It is used by the Max-Planck-Institut für

Radioastronomie. Other radio telescopes in Germany are

- Astropeller Stockert (<http://www.astropeller.de/>)
- 34 m antenna FGAN (<http://www.fhr.fgan.de/fhr/fhr.html>)

- Observatorium Trossdorf (http://www.aip.de/groups/osra/german/de_observatory_information.html)
- Geodetic observatory Wettzell (<http://www.fs.wettzell.de/>)

Solar Observatory

□□□□ There are some german solar telescopes in tenerife

(<http://obs.kis.uni-freiburg.de/tfs-index.htm>)

VI) □ Self evaluation in professional astronomy

For me, it seems to be impossible to give a qualified evaluation, therefore I mention again the results of

the “Denkschrift”:

(The “Deutsche Forschungsgemeinschaft” published in 2003 the “Denkschrift”

(<http://www.astro.uni-bonn.de/~rds/denkrds.html>)

about the status and future of astronomy in Germany from 2003 to 2016.)

According to the “Denkschrift” in Germany professional astronomy is very well established. However the number of scientists with respect to all habitants is smaller than in other European countries.

=====

PUBLIC UNDERSTANDING IN ASTRONOMY:

I) Outreach programs (national/from governments)

There are about 90 planetaria in Germany. Many of them are financed by the municipality.

(<http://www.mpifr-bonn.mpg.de/public/thomas/Planetarien.html>)

In Munich and Bonn the “Deutsches Museum” presents natural sciences including astronomy.

There are several science centers or similar institutions, which present natural science and astronomy.

II) Other Outreach programs

Max Planck institutes, DLR and the institutes of the universities have people working in public outreach.

However working in public outreach is not very accepted in professional institutes.

In Germany there are nearly 50.000 amateur astronomers with a telescope , about 2000 are doing some kind of outreach for astronomy.

III) □ Astronomy in the media

One can find several often reports about new discoveries or theories in the media. In the IYA2009 we had good contact especially to the print media. Astronomy is present in pages dedicated to science and in special broadcasts on scientific topics. The media are willing to publish new scientific results.

However, astronomy is seldom present in “normal” talkshows or in media not dedicated to science. There is also no astronomer, who is very prominent in television or other media.

Astronomy is no topic for politicians, they don't care about astronomy. Our minister for research and education did not like to support the IYA2009. Instead, she created much later an own “Wissenschaftsjahr” 2009 (science year) and spent a lot of money for activities for that and not for astronomy.

IV) ☐ Astronomy in culture

In culture astronomy is not very common. Astrology seems to be much more present. By several events during the IYA2009 we tried to introduce astronomy to several culture events. There were concerts, partly with special pieces written to astronomy and music, theatre events, the annual meeting of the protestantic church in Germany, where astronomy was present. In all of these events, we learned that the people were enthusiastic about astronomy and many of them started a new interest in astronomy. However we need efforts to bring people in contact with astronomy and simple explanations for basic facts.

There are a lot of interesting possibilities to combine astronomy and culture.

V) ☐ Self evaluation

In Germany the general public is not very well informed about astronomy. The knowledge of astronomical facts is only moderate.

There is an increasing gap between the development of science and the astronomical knowledge of normal people.

Astronomers should continue in writing press releases on their own scientific topics. However, in addition, they should also present more basic astronomy to the public. One should be aware

of the ability of astronomical observations and the fascination, which people may have by looking at the celestial objects. Taking a binocular or a small telescope and showing people the Moon, Jupiter, Saturn etc. may be a strong motivation to astronomy.

Astronomers may go out of their institutes and bring the astronomy to the public. It is very important, that scientists go and talk with people. Nevertheless all professionals should be also aware of the potential of amateur astronomers and support these colleagues.

There are by a factor of at least ten more amateur astronomers than professional scientist in each country.

=====

ASTRONOMY IN SCHOOLS:

I) National astronomy/science education programs for schools

There are no such programs especially dedicated to astronomy as far as I know

II) **Astronomy/science education programs for schools not national, not from**

government department

There are some national and more local projects, but I I suppose, that I am not aware of all of them!

National projects (e.g.):

Monet (<http://www.astronomie-und-internet.de/>) [Robotic telescops]

Science on stage (European) (<http://www.science-on-stage.de/>) [How to teach natural science]

WIS! Wissenschaft in die Schulen (<http://www.wissenschaft-schulen.de/>) [Papers and experiments to bring

recent science into schools]

There are internet offers for educational material:

Collection: (<http://star-www.st-and.ac.uk/~ch80/ALU/Schulprojekte.html>)

Local projects (e.g.):

Astronomie / vor Ort (<http://www.astro.uni-bonn.de/~geffert/AvOrt/Bericht0608.pdf>)

(Report on my own project: Teaching astronomy in all kind of school classes and even in Kindergarten)

III) Presence of astronomy in curriculum

Unfortunately, we have in Germany 16 governments with 16 different curricula. In Thüringen astronomy is a school subject for all students of class 10. On the other hand in Nordrhein Westfalen astronomy is only optional in the curriculum. In some governments some teachers are fighting for astronomy as a regular school subject.

In the eastern part of Germany (DDR) in earlier times astronomy was a regular school subject for all pupils of class 10! In these governments there are several teachers with an excellent knowledge of how to teach astronomy in school.

Astronomical topics are also optional in the curricula for primary schools.

IV) □ Status of astronomy/science in schools

There is a general agreement that astronomy is very suited to inspire natural science in young people. However teaching depends very much on the single teachers. Some don't like astronomy but some have even in the evening astronomy courses in their school.

The main part of children at the age of 6 to 12 is enthusiastic about astronomy in school. Children at the age of 14 to 16 loose the interest, and then only the “specialists” are interested in astronomy. There are by far too less teachers for physics in Germany, which is a serious problem. In some schools physic courses for upper grades don't take place.

V) □ Self evaluation astronomy in schools

Astronomy is not very well established in schools. There are good arguments having astronomy as a regular school subject. However the discussion on this topic is controversial. The governments are mainly not interested in having astronomy as a school subject.

To improve the situation, we have in Germany the last decade of the IYA2009 dedicated to "astronomy in school" and there will take place the "week of school astronomy" from 9 to 15th of november.

However, it is important to show, that astronomy may enrich the education not only in the classical topics like mathematics, physics and geography. Astronomical topics may also be included in language curses, music, biology and art. It will be very important to future, that astronomers will be open to other school topics.

We also need more professorships for didactic of astronomy and more scientist going to schools to teach also astronomy in the classrooms. My own example shows that even without large efforts this works very well.