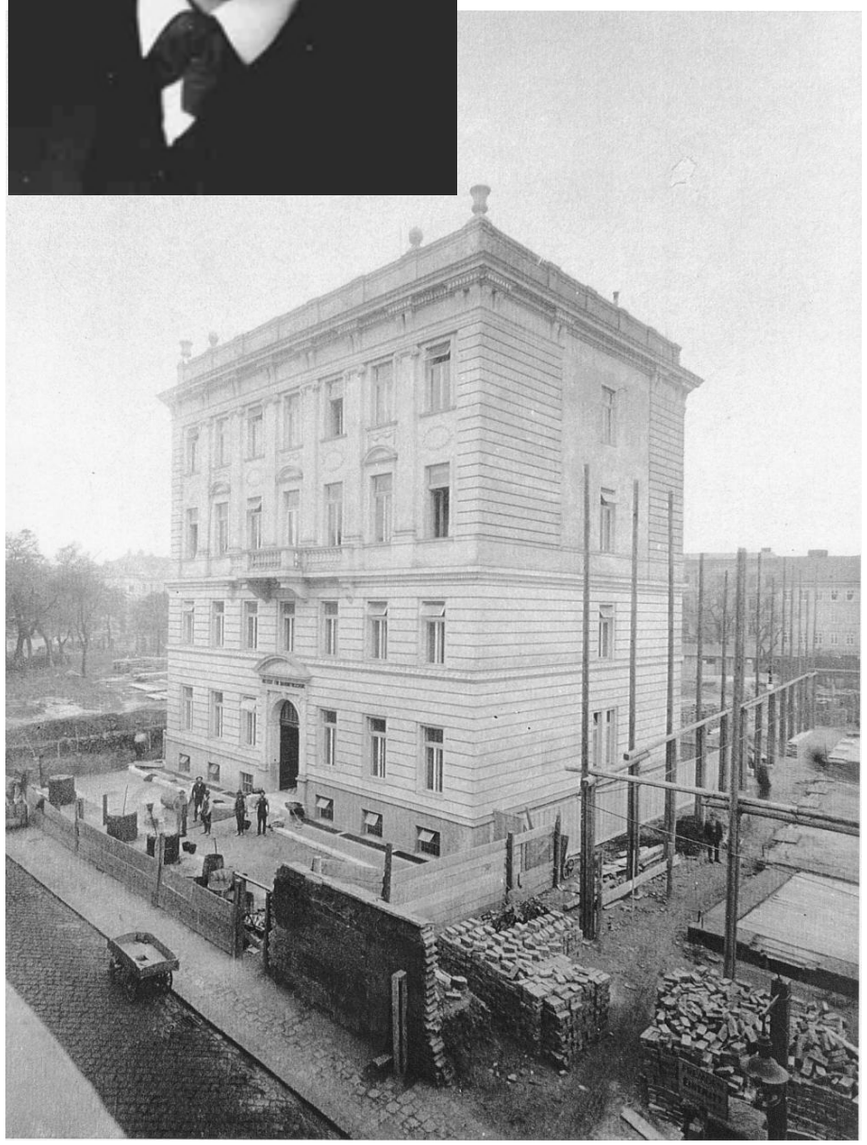
FutureJet workshop
SMI Vienna 18.-19.4.2001

E. Widmann

Stefan Meyer Institute for Subatomic Physics, Vienna

Stefan Meyer Institute - (short) History



- 1910 „Institut für Radiumforschung“
  - Stefan Meyer was first director
- 1987 Renamed to „Institute for Medium Energy Physics“
- 2002 P. Kienle IMEP director
- 2004: Appointment EW
  - Institute renamed to SMI
  - new research orientation

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HISTORY

SMI stands in the tradition of the first institute ("Institut für Radiumforschung") of the Austrian Academy of Sciences, which was opened in 1910 at the time of the emergence of a new field – the field of radioactivity research, which became nuclear physics afterwards. Due to a private sponsor (Karl Kuppelwieser) the Academy was able to set up a new institute which had remarkable success with 2 Nobel laureates (Victor Franz Hess and George de Hevesy).

Stefan Meyer was the first director of the "Institut für Radiumforschung" until the national-socialist period terminated his function.

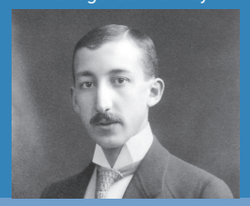
In 1987 the Institute was renamed into "Institute for Medium Energy Physics", once more at the start of a new field – muonic atoms and molecules. This field gained substantial interest due to high yield for catalyzed fusion which triggered speculations about applications.

In 2004 the institute was once more renamed to Stefan Meyer Institute, in parallel to the appointment of Eberhard Widmann as director, who substantially enriched the physics profile with experiments using antiproton beams. This research field started at CERN (LEAR and AD) and got a new long-time perspective with the emerging research facilities like FAIR in Europe and J-PARC in Japan.

Stefan Meyer

Victor Franz Hess

George de Hevesy



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Stefan Meyer Institute
for Subatomic Physics

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MISSION STATEMENT

The Stefan Meyer Institute (SMI) is devoted to basic research in the field of subatomic physics. Our research focuses on the study of **fundamental symmetries and interactions**, addressing the following questions:

- What are the properties of the forces that exist in nature?
- What is the origin of the masses of the visible universe?
- Why do the remains of the big bang consist only of matter and not also of antimatter?

We specialize in precision spectroscopy of **exotic atoms** and **exotic meson-nucleus bound states** as an integral part of international collaborations at large-scale research facilities including

- **CERN** (Geneva, Switzerland),
- **LNF-INFN** (Frascati, Italy),
- **J-PARC** (Tokai, Japan),
- **GSI** (Darmstadt, Germany) and
- **FAIR** (Darmstadt, Germany).

These are among the world's leading facilities for subatomic physics and our projects are subject to rigorous annual evaluation to monitor their progress in a dynamic and expanding field.

We aspire to perform research that increases the understanding of fundamental physics principles while simultaneously providing opportunities for young researchers in Austria to obtain valuable experience at institutes unavailable to them at home.

RESEARCH

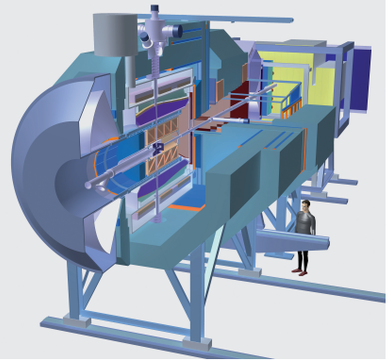
Main research activities

Matter-antimatter symmetry, especially the study of the underlying **CPT symmetry**. This symmetry is a property of all field theories used hitherto to describe nature, but is in contrast to the observed matter dominance of the visible universe. Furthermore, not all mathematical prerequisites of the CPT theorem are valid in modern theories like string theory or quantum gravity. Experimentally the matter-antimatter symmetry is investigated by precision measurements of properties of the antiproton (mass, charge, magnetic moment) in antiprotonic atoms and antihydrogen, comparing them to known properties of the proton and of hydrogen.

Hadron physics: here we study the strong interaction and its corresponding theory, quantum chromodynamics (QCD), at low energies in the non-perturbative regime and at intermediate energies. Chiral symmetry and its breaking or restoration plays an important role. They contribute to the origin of the masses of hadrons. The masses of the three current quarks add up to only a few percent of the measured hadron mass, which originates mainly from the dynamic interaction between the quarks and the exchange particles of the strong interaction, the gluons. The underlying mechanism is, to date, not understood at all. The experimental approach is the spectroscopy of meson-nucleus bound states using large 4π detectors like FOPI and PANDA, and the measurement of the effect of the strong interaction on the low-lying atomic states of simple exotic atoms by X-ray spectroscopy.

RESEARCH

PANDA Detector

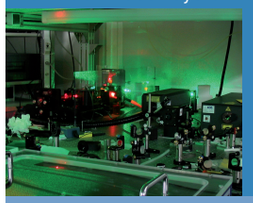


Advanced instrumentation: progress in experimental physics needs new or improved instrumentation and methodology. In this field we currently work on three experimental projects funded within the EU FP7 Integrated Activity HadronPhysics2: novel photon detectors (**SiPM**, silicon photomultipliers) for use in Cherenkov detectors, large size tracking detectors based on **GEM** (Gas Electron Multiplier) technology, and the development of high-intensity **gas jets** to be used as internal targets in accelerators. SMI also hosts one site of the **PANDA Grid** computer network and participates in the development of Grid software.

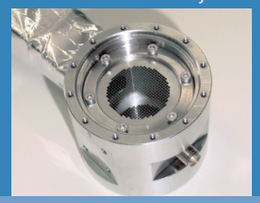
Further research activities

These include an underground laboratory experiment at Laboratori Nazionali di Gran Sasso (Italy) on a high-sensitivity test of the Pauli principle, in the **VIP** (Violation of the Pauli Principle) experiment. SMI also participates in the analysis of an experiment investigating two-body decays of stored and cooled ions at GSI. A network within the EU FP7 Integrated Activity HadronPhysics2 bringing together experimentalists and theoreticians working on strangeness nuclear physics, **LEANNIS**, is coordinated at SMI.

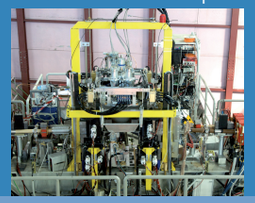
ASACUSA Laser System



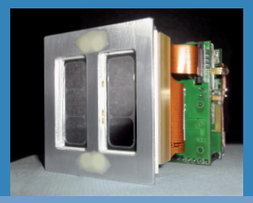
ASACUSA Cavity



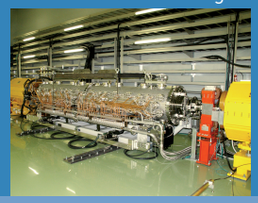
SIDDHARTA Setup



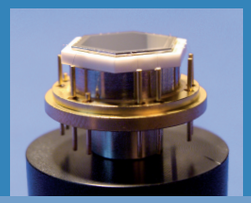
SIDDHARTA-SDD



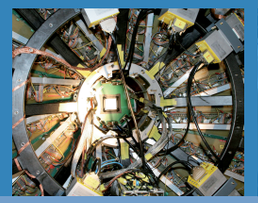
J-PARC 50 GeV Ring



J-PARC SDD



FOPI Detector



FOPI Beam Profile Monitor

FAIR

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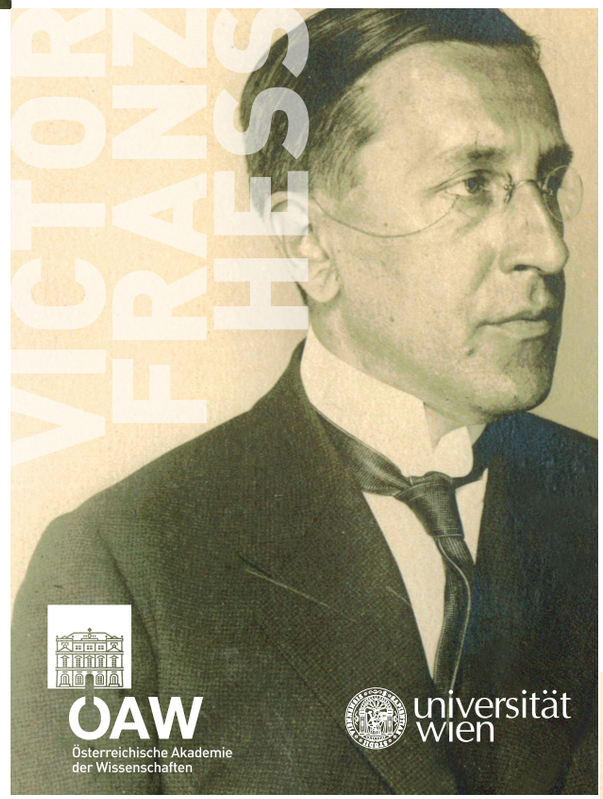
Victor Franz Hess
curriculum vitae

1883	Geboren im Schloss Waldstein bei Peggau, Stmk.
1893-1901	Gymnasium in Graz
1901-1905	Physikstudium an der Universität Graz, Doktorarbeit bei Leopold Pfaundler
1906	Promotion sub auspiciis imperatoris
1906-1910	II. Physikalisches Institut der Universität Wien
1910	Privatdozent
1910-1920	Assistent bei Stefan Meyer am Institut für Radiumforschung in Wien und Honorardozent an der Tierärztlichen Hochschule in Wien
1912	**Entdeckung der kosmischen Strahlung**
1920-1925	Ao. Professor an der Universität Graz
1920	Heirat mit Maria Breisky, Witwe mit zwei Kindern
1921-1923	United States Radium Corporation in New Jersey, USA
1925-1931	Professor für Experimentalphysik an der Universität Graz
1931-1937	Professor und Vorstand des Instituts für Strahlenforschung, Universität Innsbruck
1936	**Nobelpreis für Physik gemeinsam mit Carl David Anderson**
1937-1938	Professor an der Universität Graz
1938	Emigration in die USA
1938-1958	Professor an der Fordham University in New York
1944	Amerikanische Staatsbürgerschaft
1964	Gestorben in Mt. Vernon, New York



EINLADUNG
Festveranstaltung
zur Eröffnung des Victor-Franz-Hess-Jahres

anlässlich der
Entdeckung der kosmischen Strahlung vor 100 Jahren

FESTVERANSTALTUNG
zur Eröffnung des Victor-Franz-Hess-Jahres

anlässlich der
Entdeckung der kosmischen Strahlung vor 100 Jahren

Montag, 19. März 2012, 17:00 Uhr
Festsaal der Österreichischen Akademie der Wissenschaften
Dr.-Ignaz-Seipel-Platz 2, 1010 Wien

PROGRAMM

17:00 ERÖFFNUNG

Helmut DENK
Präsident der Österreichischen Akademie der Wissenschaften

BEGRÜSSUNGEN

Karl-Heinz TÖCHTERLE
Bundesminister für Wissenschaft und Forschung

Heinz FASSMANN
Vizerektor der Universität Wien

FESTVORTRAG

Felicitas PAUSS
CERN Genf und ETH Zürich
"LHC and Cosmic Rays – the Highest Energies on Earth and in our Cosmos"

Anschließend Empfang in der Aula der ÖAW.

HEPHY Institut für Hochenergiephysik
VERA Vienna Environmental Research Accelerator
Stefan-Meyer-Institut für subatomare Physik

E. Widmann

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Have a nice meeting