Science in Early 20th Century Germany:
The Birth of Atomic Physics and the Rise of Uncertainty

No Pre-Requisites, Language Requirements, or GPA Restrictions – Open to all students (including current first-year students)
May 10-25, 2013
PHY 370 (1 unit) – Science in Early 20th Century Germany- The Birth of Atomic Physics and the Rise of Uncertainty
Program Director: Dr. David McGee, Professor of Physics (mcgeed@tcnj.edu)

The goal of this course is to engage students in the history, technology, and personalities that combined in early 20th century Germany to radically change the understanding of the atom. This new theory overturned the very foundations of science, and introduced uncertainty as a fundamental limitation on experimental measurements. At the core of this work were Albert Einstein, Max Planck, Werner Heisenberg, Wolfgang Pauli, Lise Meitner, and Otto Hahn, all of whom worked within a relatively small triangle consisting of Berlin, Gottingen, and Munich.

The course is designed as a broad and accessible introduction to this compelling story. The events leading to atomic theory, its experimental confirmation, and its aftermath were tumultuous not only for the scientific community, but had tremendous impact on the political and cultural landscapes of Europe, Asia, and North America as well. One outcome with far-reaching technological impact was an understanding of why the elements are structured according to the periodic table, and how they bond to form molecules. This rapid advance in understanding the building blocks of nature also came at a time of unrest in Germany with the rise of National Socialism. This unusual confluence of scientific and political revolution coupled in a vicious spiral, as Germany, the United States, and Japan embarked on a massive endeavor to exploit the newly uncovered laws of atomic physics to unleash nuclear energy in the form of a weapon. In many ways, the rise and fall of Germany during this period can be traced to the remarkable work of its scientists in developing atomic theory, followed by their flight from Nazism in order to devote their work to ending World War II.

The rationale for offering this course in Germany centers on the unusually dense concentration of historical, cultural, and scientific resources available and easily accessible in Berlin, Munich, and Göttingen. The student group will first fly into Berlin and experience the city where science and politics collided in the early 20th century. Highlights will include the Max Planck Institute for the History of Science,Humboldt University, and the German Museum of Technology. Stops in Göttingen, Erfurt, and Jena will showcase the academic milieu of scientific research in Germany – all three cities are "university towns" where dozens of Nobel Prize-winning scientists achieved their discoveries. Students will participate in readings, discussions, and guest presentations centered on the popular book "Thirty Years That Shook Physics" by George Gamow. (Gamow's book is widely considered as the most complete and accessible exposition of the events surrounding the discovery of atomic theory and will be the guiding resource for this course.) The course will conclude in Munich, home of the Deutsches Museum – one of the world's most important collections on the history of science and technology – and the Ludwig-Maximilian-Universität, a major center of contemporary scientific research in the heart of Bavaria's capital.

Program Cost:

- **In-State: $3,326.72**; **Out-of-State: $4,762.20**

Program Cost Includes: Tuition, Land travel – accommodations, breakfasts, train transportation, metro tickets, entrance fees, Insurance
Program Cost Does Not Include: Airfare, some lunches/dinners, personal expenses

Questions? Contact the Center for Global Engagement at goglobal@tcnj.edu

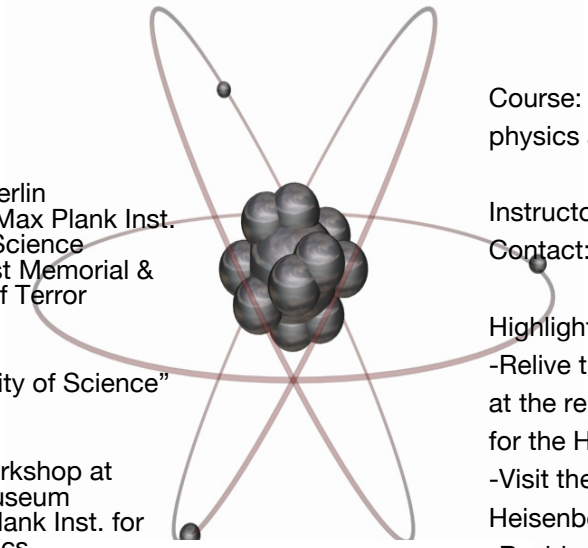
For more info & to apply go to: http://www.tcnj.edu/germany-science

STUDY SCIENCE IN GERMANY

MAY 10-25, 2013

BERLIN GÖETTINGEN MUNICH

THE BIRTH OF ATOMIC PHYSICS & THE RISE OF UNCERTAINTY



BERLIN

5/10	Arrival
5/11	Bike tour of Berlin
5/13-14	Workshop at Max Plank Inst. for History & Science
5/15	Visit Holocaust Memorial & Topography of Terror

GÖETTINGEN

5/17-18	Stay in the "City of Science"

MUNICH

5/19-23	Residency workshop at Deutsches Museum
5/24	Visit to Max Plank Inst. for Quantum Optics
5/25	Departure

Course: PHY 370 The birth of atomic physics and the rise of uncertainty

Instructor: Prof. David J. McGee
Contact: mcgeed@tcnj.edu

Highlights:
-Relive the work of Einstein and Planck at the renowned Max Planck Institute for the History of Science in Berlin.
-Visit the workplace of Werner Heisenberg in Göttingen.
-Reside at the acclaimed Deutsches Museum in Munich.

$$\left[\frac{-\hbar^2}{2m}\nabla^2+V\right]\Psi=i\hbar\frac{\partial}{\partial t}\Psi$$

REGISTER NOW FOR PHY 370

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