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Guest Editorial

Dieter H.H. Hoffmann at 60 Years

On the 60th birthday celebration of the Editor-in-Chief, Professor Dieter H.H. Hoffmann, I have the favorable pleasure to most cordially wish him in the name of all involved with the journal *Laser and Particle Beams* all the very best, luck, and pleasures, and further a blessed time with his family, friends, and supporters. After Dr. Simon Mitton from Cambridge University Press encouraged me in 1992 to found this journal and to be the first Editor-in-Chief, followed by George Miley, it was Dieter's unique enthusiasm and engagement that very quickly raised the impact factor since 2002 to 4.8 making it one of the top journals on Applied Physics. This is an opportunity to express to him our sincere thanks for his most outstanding achievements, working very hard with his team and serving the community worldwide, last but not least, with the high class articles in *Laser and Particle Beams*, and wishing him further great success.

Dieter H.H. Hoffmann was born April 15, 1950 in Hildburghausen/Thuringia, which at that time was behind the iron curtain as part of East Germany. Under the cover of darkness the family fled to evade political oppression in 1954 to the West German City of Hagen in Westphalia. There he grew up and went to school. He started his academic career at the University of Bochum in 1969 where he received a double degree in Mathematics and Physics, then continuing in the nuclear physics department in Bochum which had a powerful Tandem accelerator. Nuclear Physics at that time was a hot topic, maybe most notably for the fact that nuclear power held the promise for clean, safe, and abundant energy to support a powerful industrialized society. For his diploma thesis, he investigated the fusion reaction $d(d,n)^3$He. For this purpose, a neutron time of flight detector was developed, and a special movable target holder to ensure that fragile targets are able to withstand the high beam intensity (Hoffmann *et al.*, 1974). At that time, only a minority of physicists could have known how the premonition that fusion as well as intense laser and particle beam, would give distinction to his later scientific career. When his professor Armin Richter accepted a call to the Technical University Darmstadt, Dieter Hoffmann joined him and worked on a Ph.D. thesis topic related to atomic physics in relation to inner shell ionization by relativistic electron impact (Hoffmann *et al.*, 1979). Inner shell ionization cross-sections were measured in great detail for electron energies up to 60 MeV. Today this is an energy regime that is easily accessible for laser generated particle beams and cross-sections measured almost 30 years ago are now very valuable data for current research (Bessonov *et al.*, 2008; Nakamura *et al.*, 2008). He obtained his Ph.D. (Dr. rer. nat.) with excellent marks from The Technical University in Darmstadt in 1979. Subsequently, he won a prestigious research fellowship (Feodor Lynen Stipendium) from the Alexander von Humboldt Foundation. This fellowship led to an almost two year research stay at the Stanford University in California (1979–1981), followed by a short research stay as a summer research visitor at Brookhaven National Laboratory. He worked at the Stanford Superconducting Accelerator in the High Energy Physics Laboratory (HEPL) in relation to nuclear structure physics, to investigate Giant Resonances induced by inelastic electron impact (Collins *et al.*, 1982; Sandorfi *et al.*, 1983).

After returning to Darmstadt (1982) he searched for new opportunities in science. GSI-Darmstadt (Gesellschaft für Schwerionenforschung Darmstadt) at that time was still a young and expanding institute aiming for research with

heavy ion beams in nuclear physics, atomic physics, and applied areas. One of the new topics for GSI was the investigation of intense heavy ion beams as driver for inertial fusion energy. This topic comprised accelerator physics at the forefront of accelerator physics, atomic physics, nuclear physics, material science, and related topics. This multidisciplinary field was ideal for Dieter Hoffmann to yield interest from the various field of science he had been engaged with during his still young scientific career at that time. One of the first topics to be addressed in target physics was the question of preheating a fusion pellet by hard X-rays generated by the intense ion beam (Anholt & Hoffmann, 1985), where they used X-ray cross-sections that were measured during a series of experiments together with Anholt *et al.* (1984*a*, 1984*b*). This triggered the general problem of beam matter interaction, especially when after some time during the heating process matter turns into plasma. A series of investigations to measure energy loss and charge state distribution of ions passing through plasma was started being known today to the community as classical beam plasma interaction experiments. Based on the exciting results of these experiments (Dietrich *et al.*, 1992; Hoffmann *et al.*, 1990; Jacoby *et al.*, 1995) he completed a habilitation thesis in 1994 and was called to the Friedrich Alexander University in Erlangen, Bavaria to take a chair as Professor of Experimental Physics. This prestigious chair of physics was instituted in Erlangen as early as 1857 with the appointment of Rudolf Kohlrausch. Dieter Hoffmann was a full professor of Physics in Erlangen from November 1994 until March 1998. During this time his group in Erlangen worked on discharge pumped extreme ultraviolet lasers (Wagner *et al.*, 1996*a*). Here they were the second group worldwide to achieve amplification of extreme ultraviolet radiation at wavelengths about 50 nm in recombining Z-pinch plasma. Here Dieter Hoffmann started his habit to announce important results in the form of letters and to publish a detailed account of the experiment in the journal *Laser and Particle Beams* (Eberl *et al.*, 1997; Wagner *et al.*, 1996*b*). In a collaborative effort, the group in Erlangen developed a plasma lens for beam transport of antiprotons at CERN and Dieter Hoffmann suggested to use this principle to focus an intense heavy ion beam for high energy density physics experiments at GSI (Boggasch *et al.*, 1991, 1992). He responded to a call onto a full professorship in physics at the Technical University Darmstadt already in April 1998 and he was asked to take the scientific leadership of the plasma physics group at GSI, which later under his guidance developed into the plasma physics department.

Since his early career, Dieter Hoffmann placed a lot of emphasis on international collaboration. Since 1988 he developed strong collaborative ties to institutes in Russia which at that time was still Soviet Union (Fortov *et al.*, 2008; Hoffmann *et al.*, 2002). The success of this collaboration is documented in numerous publications. In recognition of his achievements in high energy density physics he was awarded an honorary doctorate from the Russian Academy of Sciences.

For 10 years, Dieter Hoffmann was head of the plasma physics department at GSI. During this time he initiated a project to build a high energy laser system at GSI interaction experiments of ion beams with high temperature, high density plasma (Neumayer *et al.*, 2005; Schaumann *et al.*, 2005). Today two laser systems at GSI are in place and they are part of the European Laserlab network. An important part of the work continues to be the application of intense ion beams to generate extreme states of matter. A new international accelerator laboratory is currently being built, which is called Facility for Antiproton and Ion research (FAIR). This new laboratory is adjacent to GSI and will use the GSI accelerators as injector. In 2005, Dieter Hoffmann elaborated the perspectives of high energy density physics using intense ion beams from this future facility (Hoffmann *et al.*, 2005). He is the spokesperson of a collaboration named High Energy Density generated by Heavy Ion Beams (HEDgeHOB). Over the next couple of years this collaboration will build the experimental facilities for High Energy Density Physics Experiments at FAIR and will continue to explore the properties of heavy ion beams for inertial fusion. To this respect, a number of activities are going on and cover the range of target performance simulation (Tahir *et al.*, 2004, 2008; Temporal *et al.*, 2005) to the development of advanced targets for experiments (Koresheva *et al.*, 2009) and beam plasma interaction experiments with intense heavy ion beams (Adonin *et al.*, 2009; Ni *et al.*, 2008).

Since 2002, Dieter Hoffmann is involved in experimental activities at CERN in Geneva. Due to his activities it was possible to get the CERN Axion Solar Telescope (CAST) running, which is continuously taking data since 2003. First results on the limit for the coupling constant of axions to photons have been published (Zioutas *et al.*, 2005). This is one of the key experiments in astroparticle physics and dark matter research. Hoffmann and Zioutas have proposed to study the emission of X-rays from the quiet sun (Zioutas *et al.*, 2004*a*, 2004*b*). This has resulted in an active satellite program to search for signatures of new particles. Also the Large Hadron Collider (LHC) at CERN is in the focus of his current research interest. Recently, it was proposed to use petawatt laser pulses of picosecond duration for detailed diagnostics of creation and anihilation processes of B-mesons in the LHC (Hora & Hoffmann, 2008). Moreover, the intense beam from the LHC is also a unique tool to generate extreme states in matter (Tahir *et al.*, 2005, 2009).

Dieter Hoffmann is a dedicated academic teacher and a large number of students (close to 100) have completed their thesis work under his academic guidance. This includes Bachelor-, Master-, Diploma-, PhD theses and Habilitations with students from many countries like Russia, USA, Germany, Spain, Ukrainia, Greece, Marokko, Pakistan, Spain, Italy, and others. His well known Saturday Morning Physics lectures attract more than 400 students every year.

In October 2009, he was awarded an honorary professorship at the Xian Yang Normal University in China and our

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picture shows him during his inaugural address at this university.

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