THE NETHERLANDS' PHYSICAL SOCIETY, NNV

A VIBRANT COMMUNITY OF 4000 PHYSICISTS[1]

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president of the Netherlands' Physical Society

It was a lively conference, the annual meeting of the Netherlands' Physical Society (*Nederlandse Natuurkundige Vereniging*, NNV) on April 10 at Eindhoven University of Technology. In addition to the plenary morning sessions and six parallel sessions in the afternoon, there were award ceremonies for the Teacher of the year and for the best Bachelor thesis, a Young Speakers Contest and a Physics Market. And the 2015 winner of the prestigious Physica award, Marileen Dogterom, delivered the Physica lecture. But what precisely is the NNV?

Physical societies haven been founded in other countries well before the NNV: the Deutsche Physikalische Gesellschaft (DPG) started as early as 1845, the British Physical Society (now called IOP) in 1874, and the American Physical Society (APS) in 1899. At the turn of the century the Netherlands witnessed a blooming period in physics, with important discoveries by Lorentz, Zeeman and Kamerlingh Onnes, among others. The community of physicists grew rapidly, in numbers as well as in diversity. Many found employment in education, others in industry. This led to the need to maintain contact and to create a platform for discussions.

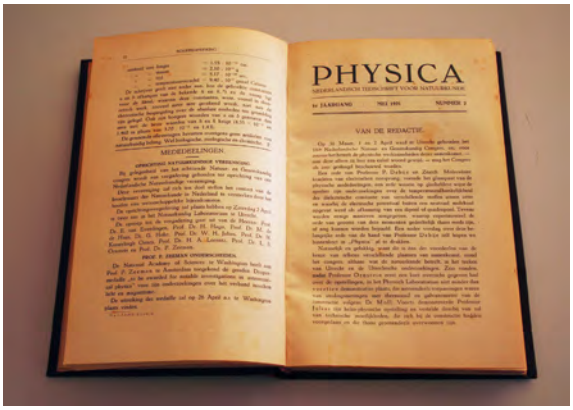
In 1921 the NNV was founded on the initiative of a distinguished group of physicists, among which three Nobel prize winners (H. Kamerlingh Onnes, H.A. Lorentz, P. Zeeman) and the director of Philips Research Laboratories, Dr. G. Holst. The role of Philips in these first years was quite prominent. In 1913 the Philips brothers had created a laboratory, the "Philips Natuurkundig Laboratorium", and Gilles Holst (who did the experiments with Kamerlingh Onnes that led to the discovery of superconductivity) was the first director of the laboratory. He became NNV's first president.

The society started with 40 members, and initially had the character of a debating club. The members met once a month on Saturdays to attend a lecture, after which the company joined for a meal. Even so, the NNV was influential in reforming the physics programme in high schools, and served as contact and partner for international organizations.

Just before the NNV was founded, the Dutch physics journal *Physica, Nederlands Tijdschrift voor Natuurkunde* was established in 1921. The journal published both news items relevant for the Dutch community and scientific articles. The standard language was Dutch, but summaries were given in English, French, German or Esperanto, and contributions in these other languages were invited. However, after the first decade the journal was struggling to survive.

In the 1930s, political developments in Germany made it impossible for Jewish scientists to publish in the prestigious Zeitschrift für Physik. As a response to these unfortunate developments, it was decided in 1934 to create a truly international scientific journal. The two separate functions of the existing journal were split into an international scientific journal Physica, and a Dutch journal with the name *Nederlands Tijdschrift voor Natuurkunde* (NTvN), which became – and still is – the official magazine of the NNV.

Both journals became a success. In 1948, the rights of the journal Physica were sold to the scientific publisher Elsevier. For the stewardship over the royalties the Foundation Physica was created, which continues to provide a significant amount of sponsoring to the NNV.



◂ **FIG. 1:** The first issue of Physica, containing the announcement of the creation of the NNV in 1921.

The NNV today

The actual number of physicists in the Netherlands is estimated to be between 14 000 and 18 000. Although physics-based industry is not as clearly identified as chemical industry, there are many companies that employ large numbers of physicists. Philips, which played a major role in the start of the NNV, is still actively involved. However, the company's emphasis on physics-based research and development has been diminishing. Meanwhile, other companies are growing and hiring many physicists, a prominent example being ASML, the leading company in wafer-steppers, based near Eindhoven.

The membership number of the NNV is currently close to 4000 (Fig. 2), approximately 25% of the Physics community. Among the members are undergraduate students, PhD students, and academic staff. Apart from this main group there are members from industry research labs, high school teaching, consultancy, finance, government, self-employed professionals, *etc.* Students are stimulated to join NNV early on by attractive low-rate membership fees and by sponsoring of student initiatives, such as travel abroad.

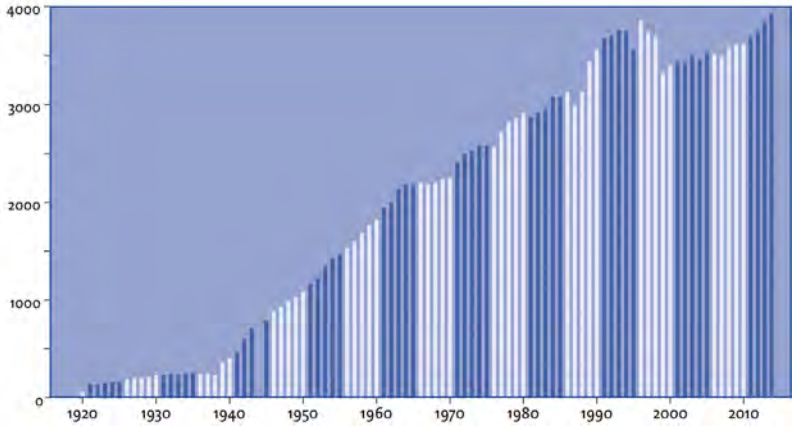
◂ **P. 22:** Plenary session during Fysica 2015

Only recently has the NNV created a professionally run office, rented in the buildings of the FOM institute Nikhef in Amsterdam. In addition to the director, Noortje de Graaf, two editors for the journal and two part-time administrative support staff are employed.

The president of the society is elected by on-line elections since 2013. The candidates present themselves in the journal NTvN (see below) and all members are invited to vote electronically. The person elected will serve as vice-president for a year, followed by two years as president. Daily affairs are handled by the executive committee: president, vice-president, secretary and treasurer.

The Board of the NNV consists of 15 members representing the various communities, and meets six times per year. Contacts with the NNV members proceeds via the annual general assembly meetings at the FYSICA symposium, through communications in the NTvN, and through the divisions. In addition to divisions on subfields of physics, the NNV has divisions on Education and Communication, Energy and Climate, Business and Innovation, and on History and Foundations.

[1] This article is largely based on an earlier contribution to *Il Nuovo Saggiatore*



▲ FIG. 2: The number of members of the NNV over the years.

The journal *Nederlands Tijdschrift voor Natuurkunde* (NTvN)

Although the journal NTvN is the official magazine of the NNV since 1934, the editorial board has remained largely independent, and this independence is valued and cherished from both sides. Apart from two professional editors employed at the office, the NTvN has an editorial board that is currently presided by Dr. Richard Engeln of Eindhoven University of Technology. The board comprises over 30 members, representing the various domains of physics and the various professional communities. The NTvN is the only professional physics journal written in Dutch. This makes it attractive for reaching out to a larger audience, including high schools students, but has the intrinsic limitation that it does not reach the non-Dutch speaking community in the Netherlands and abroad. A (partial) transition to English has been debated for some time, and is likely to be made in the near future (see discussion on the issue of language below).

The journal appears monthly (4500 copies, 32 pages) and has evolved into a colourful and varied magazine. Obviously, it reports on recent developments and discoveries in research, with the editorial board being heavily involved in editing the contributions for clear and concise presentation. Yet the scope is much broader, with interviews, columns, book reviews, and fixed items such as "Know your classics" describing concepts and history of break-throughs in physics, and the item "Career" presenting physicists in an unusual or remarkable trade. Once a year a special issue is produced, which has often twice the regular number of pages and presents the state of the art in a specific field of modern research. Previous special issues on Elementary Particles and on Quantum Information were very well received, and nearly 500 additional copies were sold, many to high schools and high-school students. This year's special issue focusses on the International Year of Light (Fig. 3).

▼ FIG. 3: Cover of a recent issue of the magazine of the NNV, the *Nederlands Tijdschrift voor Natuurkunde*

Roles of the NNV and present activities

The primary goals of the NNV are to represent the physics community, to defend the interest of physics and physicists in the Netherlands, and to provide a platform for exchange of information and networking. Although there are several sister organizations for specialized communities like high school teachers and physics engineers, the NNV is the only organization that brings together all physics professionals, be it in education, research, industry, government, or self-employed.

As part of our role we monitor student numbers and the job market. In this context, the NNV has recently developed a brochure giving an overview on the career perspectives. It provides factual information on numbers and possibilities, illustrated by a selection of personal accounts of professionals working in various careers. This booklet is widely distributed and is yearly updated.

Outreach is one of the central activities of our society. Among the successful initiatives are the following three.

1. A decade ago we co-initiated the launch of the website Natuurkunde.nl, followed by Sciencespace.nl in 2009. The first is aimed at high school students and teachers, while the second aims specifically at a younger audience at the first years of high school. They provide in a playful and attractive way information on recent developments in physics, or science in general, and provide background information, illustrations of scientific concepts and ideas, and teaching material for the teachers. The websites are very popular, as illustrated by the more than 820.000 visitors per year for Natuurkunde.nl.
2. A second outreach initiative is a competition under the name of Techniektoernooi (technology tournament), a spin-off from the World Year of Physics 2005. Young minds at the primary-school age are very inquisitive and most open to science and technology. Unfortunately, the teaching programme and the limited science background of most teachers result in minimal attention to science and technology in the class room. With the *Techniektoernooi* we succeeded in reaching a large fraction of the primary schools. Each year new challenges are presented to the children. They form teams that first participate in regional competitions, and the best teams are then invited to a national competition in the Open Air Museum in Arnhem. Every year some 150 teams participate in this cheerful event.
3. Finally, the NNV offers travel programs for high-school students, with travels, *e.g.*, to CERN in Geneva, the Institute Laue-Langevin in Grenoble, the European Southern Observatory at La Palma, or Desy in Hamburg. Every year about 500 pupils and 50 teachers from all over the Netherlands return from such trips with great enthusiasm and inspiration.

Annual symposium

The main networking event is the yearly symposium **FYSICA**. It is a one-day symposium that is hosted by one of the Dutch universities. The meeting attracts 500 to 600 participants from all sectors of our physics community (Fig. 4). Among the plenary speakers is traditionally the most recent Physics Nobel Prize winner. A most successful item is the Young Speaker Contest: young researchers, mostly PhD students and postdocs, submit an abstract for the competition. From the initial batch of about 30 contestants, three are selected for the final, which is held at the FYSICA symposium. The winner is chosen by the entire audience of the symposium in a written vote. Also other prizes are awarded at the symposium, including the Physica Prize which is the most prestigious national physics prize, the Best Physics Teacher Award (Fig. 5) and the NTvN prize for the PhD candidate who writes the best article on her/his own research for the *Nederlands Tijdschrift voor Natuurkunde*. The FYSICA event is complementary to the main national scientific meeting, a two-day symposium organized by the science Foundation FOM every year in Veldhoven, called Physics@FOM.

Present-day issues

Since a few years the number of students enrolling for physics is rising. In fact, we are currently witnessing an all-time high in physics enrollments. This is quite satisfying, but there are also points of concern.

One is the language barrier in view of the increasing number of non-Dutch-speaking physicists in the Netherlands. While the language of the FYSICA symposium is English, the journal NTvN and the website of the NNV are in Dutch. An estimated 50 to 60% of all physics PhD students are from abroad, and an even larger fraction of the postdocs. Faculty positions are advertised internationally and many recent hires do not speak Dutch upon arrival. Given these developments it is inevitable to adjust our communication language. It is our ambition to attract a membership in the non-Dutch part of our physics community that is comparable to the fraction of native physicists.

Another concern is the shortage of high-school physics teachers. Many high-school students are not receiving a science education that is as stimulating as it could have been. I have great respect for the teachers who do a wonderful job without university degree. Yet, the broader scientific experience offered by a university degree can make a great difference for those students whose curiosity extends beyond the standard program.

Let me end by mentioning our role in the International Year of Light. We are happy that Dr. Kobus Kuipers of FOM institute AMOLF has been willing to chair the national committee. A sizeable group of enthusiasts has been assembled, including university faculty, science museum directors, artists and representatives from industry. The website, IYL2015.nl lists the activities for a wonderful year of opportunities for physics outreach. ■

▲ FIG 4: Registration desk of FYSICA 2015

About the author

Jan M. van Ruitenbeek is a professor in experimental physics at the Huygens-Kamerlingh Onnes Laboratory of Leiden University. His current interests include molecular electronics and nanoscopic electron transport in general. He obtained his PhD degree from the Radboud University in Nijmegen. From 1985 to 1988 he held a postdoctoral position at the MPI-CNRS High Field Magnet Laboratory in Grenoble. Since 1988 is in Leiden, and has been visiting scientist at CEA in Saclay, France in 1994, at Chalmers University of Technology in 1999, and at the Thomas J. Watson Research Lab of IBM at Yorktown Heights in 2011. He was Scientific Director of the Leiden Institute of Physics from 2007 to 2011 and is currently Scientific Director of the Casimir Research School Leiden-Delft and president of the Netherlands' Physical Society NNV.

▼ FIG. 5: Leo van Dijk, Physics Teacher of the Year 2015