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12 November 2015	020 525 5784
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Subject
Letter of intent for a Joint Institute for Physics and Astronomy

Dear dean, dear Karen,

The UvA Institute of Physics (IoP), the UvA Anton Pannekoek Institute (API) and the VU Department of Physics (N&S) have investigated the formation of a Joint Institute according to the WHW article 8.1 as a “gemeenschappelijke regeling”. The current working title for this new institute is *Department of Physics and Astronomy* (DPA). The mission of DPA is to be a robust, broad, and world-leading centre of excellence that fits into a long tradition of research and teaching in physics and astronomy and their many applications, expanding our knowledge and passing it on to future generations.

With this letter, we declare that on balance of the current evidence we see good prospects for forming DPA, and ask admission to the next phase in the Roadmap presented by the Dean for forming Joint Institutes, in which a concrete and specific plan is made for DPA as a Joint Institute, so that an actual and precise decision on the formation of DPA may be made.

1. Steps taken by core team DPA

The DPA core team consists of the institute directors and managers/coordinators of the three participating institutes, and the chair of the Exploratory Committee for Education: Daniel Bonn (IoP/UvA), Joost van Mameren (IoP/UvA), Gijs Wuite (Physics/VU), Niels Laurens/Johan Gemser (Physics/VU), Ralph Wijers (API/UvA), Annemarie van Groenesteijn (API/UvA), Wim Vassen (chair ECE).¹

From 2012 onwards, the directors and managers of the DPA progenitor institutes have met regularly to plan and discuss the setting up of collaboration and participate in the formal UvA-VU discussions. The involvement of staff and students also dates from the earliest days of the DPA discussion, albeit informally. This informal interaction continues to this day, but since the creation of the DPA core team in early 2014, we have also interacted with our staff and students in more formal, announced and minuted meetings. Starting in 2013 (still anticipating the formation of the Amsterdam Faculty of Science), we have organized two meetings of all the staff, so they could get to know each other across the institutes, and discuss collaboration matters. The core team has met roughly bi-weekly since its creation; topical meetings were also organized with relevant staff groups, e.g., on laboratory housing. Furthermore, the core team has organized two rounds of explicit, formal comments and input with all tenured staff members, and one with all students on education aspects, in the spring, summer, and fall of 2015. For education, the core team set up a broad advisory committee consisting of

¹ The composition changed due to personnel situations: At API, Van Groenesteijn went on leave, and at VU physics, Laurens changed jobs and was replaced by Gemser.

staff and students, the Exploratory Committee for Education (ECE), in order to get a wide consultation of all relevant stakeholders and careful consideration of the issues. The ECE wrote a separate report, the conclusions of which were accepted in full by the core team, and included in the collaboration plan. Via information sessions at staff lunches, DPA newsletters sent to the entire Physics and Astronomy community of UvA and VU, and discussions with individual people who voiced concerns or suggestions for synergy, we kept our community informed of progress. Via a number of meetings with the deans and advisory committees, we gave and received feedback to and from higher levels in our universities.

The purpose of our planning and discussion process has been twofold: first, to try to create an as concrete as possible plan for DPA, and in the process of trying to do so, weigh the advantages and disadvantages of the formation of a Joint Institute as well as possible. Second, to enhance familiarity and trust between the communities of the institutes that might form DPA, and begin to create the feeling of being a single community. VU and UvA have already collaborated in teaching for more than a decade, and so some commonality already existed, but in research this took more time and effort, although the Sector Plan for physics and chemistry had already achieved significant alignment of research priorities within physics between UvA and VU. Progress has been clearly detectable over time. From our first joint staff day in the fall of 2013 to now, many more people know each other directly via the many cross-institutional discussions that took place to create the plan. We put a rough draft plan to our community in March 2015, which raised considerable concern and upheaval about many matters; when we resubmitted in October 2015 a more complete plan that had taken the feedback from March into account, the response was much more positive. The remaining matters could be addressed, further improving the plan, or deferred because they were practical matters that belong to the next phase. In the meantime, some significant successes of the collaboration process have already been achieved: we created Joint Degrees in Physics and Astronomy for the BSc and MSc, with support of our community and formal consent of the Works Council and Student Council, and in research we are already creating a lot of new synergy, and attracting new partners to Amsterdam, such as ARCNL, ECN, and SRON.

It has been easy to see from the start that there are great potential advantages of the DPA collaboration, which mostly are of a strategic and long-term nature, and will therefore take time to materialize. However, it is also clear that the current Institutes all have long traditions and strong identities and reputations, which they quite rightly treasure. The potential for loss or dilution of these, and the risks that are always associated with a large and complex change, are potentially significant disadvantages, which are also easy to see. In our process, we have therefore addressed these extensively via deliberations and community consultation, and forged a collaboration plan that tries to reap the benefits of collaboration, interdisciplinarity, and greater influence of a large DPA while preserving the agility and excellence of the existing Institutes. Our SWOT analysis reflects these issues in more detail.

The intermediate result of our process is the collaboration plan that we submit with this letter. The fact that we have such a plan, with broad consensus from our community, and that we wish to enter the next phase of the process, indicates our judgment that on balance of the current evidence, the advantages and opportunities of DPA outweigh the disadvantages and risks. We view this as a large, significant step in the process of forming DPA, but by no means as the final step and a definitive judgment. The present plan only addresses the broad principles of how we wish to run and organize DPA. The practical implementation of it in a concrete plan will still need to address many of the short-term and pragmatic concerns of our community on whether we can make DPA manageable in many ways, and agree on all the practical details that need to be put in place. It is also needed to test whether a complex Joint Institute such as DPA can indeed be set up between UvA and VU. This is precisely what the next phase is for, according to the Dean's Roadmap, and therefore we do wish to start that phase. We plan to conduct our work in the next phase in the same bottom-up way as we have done to date: aiming for consensus, asking regular feedback from all stakeholders, and building trust and familiarity between our communities, while addressing the issues identified in our SWOT analysis as much as possible.

2. Strategic outlook

Innovation increasingly occurs through close collaboration, within powerful and tightly-connected centres of intellectual capital. In Amsterdam, the physics and astronomy departments/institutes of the VU and the UvA, which have independently built a proud and complementary reputation of scientific excellence, seek to enhance their capabilities and (inter)national visibility very significantly by leveraging the synergy made possible in the creation of a joint academic department, The Amsterdam Department of Physics and Astronomy. The structure of this joint department with around 100 principal investigators spanning all modern areas of physics and astronomy and a primary physical location at the Amsterdam Science Park East will strengthen on-going research, facilitate new joint activities and help to build Amsterdam as a visible and internationally recognized centre of scientific progress in our fields within both Europe and the world.

2.1 Highly talented staff and research facilities

The primary asset of DPA is a large and diverse body of highly talented people. Consequently, fostering an environment in which top talent can thrive, interact and is facilitated in their work will be the primary duty of the DPA. This implies making room for a wide range of styles: from the lone wolf to the large research group, from deep, basic problems of natural law to applied and instrumentation research that advances other fields and improves our lives in practical ways. To this end, DPA will provide a stimulating intellectual environment with excellent facilities to attract, retain, and train all available top talent: students, faculty, and support staff. It will also be open to the world and be able to seize the many opportunities that its environment offers; notably the close proximity of many other institutes, both at Science Park (Nikhef, ARCNL, AMOLF, CWI, SRON, ECN, ...), in some of which UvA and VU already closely participate, and at the VU Campus (VUmc, NCA, ...). This will allow our researchers to share their knowledge and collaborate with that outside world and experts in other areas, industry, and society.

The starting point of DPA is a particularly solid one: three institutes with a strong reputation in their own areas of expertise, with their core teaching at BSc and MSc level already aligned. Where DPA will still make great strides is in areas where combining efforts is particularly beneficial: creating higher visibility as a large centre of excellence across the breadth of physics and astronomy, more efficient provision of very good facilities (e.g., experimental facilities, high performance computing resources), joint advertising and recruiting. We will be a total of 350 PhD-level researchers in the DPA, and an even larger number in related institutes in Amsterdam. At the Science Park alone, there will be around 750 physicists and astronomers at work- by far the largest community in the Netherlands. This constitutes a level of effort and critical mass that matches the foremost centres of physics and astronomy in the world. A large fraction of these will be concentrated at Science Park East, creating a concentrated hub of activity, and at the same time significant numbers of physics and astronomy researchers are present at Science Park South, close to the medical centre and other life science activities.

2.2 Education and student affairs

Just as the DPA will be an inspiring and stimulating research environment for our staff members, it will also be an inspiring and exciting place of education for our students at all levels. We will continue to strive for an education system that changes from teaching in large lecture classes and smaller problem classes and practicum instruction groups early in the programme to more individual projects and smaller classes in later years, to the classic, individual master-pupil relation during the MSc and PhD thesis research. We will encourage our students to take responsibility for their own education, feeling empowered to contribute ideas to our community, and aim to prepare them for the largely international job market that awaits them after their studies, and stimulate entrepreneurship among them. Part of achieving this will be through making our environment as international as possible, and getting students to exchange ideas with peers and colleagues from other parts of the world as early as possible in their career.

Programmes for visiting scholars, student scholarships, schools, and colloquia will be used to attract talent from all over the world, promote our activities to other renowned institutions, and raise the level of intellectual excitement in the Department. By joining forces, the impact of these activities will increase significantly, both

because the excitement we create locally is shared with a broader community, and because it reaches a larger combined audience in the world. Both in research and education we will aim at the global community of physics and astronomy, forging connections with individual researchers, groups, and institutions, and recruiting talent globally into our international bachelor, master, and PhD programmes, and faculty. Specifically, we will aim to create the conditions that enable all our education, including our BSc programme, to be taught in English (with provisions for teacher and outreach training in Dutch, and for easing Dutch students into the programme).

The educational programmes for which the DPA is responsible at the BSc level are:

- Natuur- en Sterrenkunde (exclusive),
- Joint Degree Natuur- en Sterrenkunde (exclusive),
- Medische Natuurwetenschappen (MNW; shared with VU chemistry),
- Science, Business and Innovation (SBI; shared with VU chemistry and VU-FEWEB).

At the MSc level, these are:

- Physics (exclusive),
- Astronomy and Astrophysics (exclusive),
- Joint Degree Physics and Astronomy (exclusive)
- Medical Natural Sciences (MNS; shared with VU chemistry).

The MSc SBI is presently a track in the MSc Physics and the ECE assumes it will become an independent MSc in future. Apart from the Physics and Astronomy programmes, DPA is the natural primary owner of the MNW and MNS programmes, with teaching primarily organized at the VU campus. For SBI (BSc and MSc) DPA is the co-owner of the programme, jointly with VU chemistry and VU economics (FEWEB). Besides these, the DPA staff play a crucial role in the UvA BSc programme beta gamma (organized by the Institute for Interdisciplinary Studies, IIS), in particular for the major track Physics therein.

An Exploratory Committee for Education (ECE; ‘verkenningcommissie’), installed by the DPA core team and consisting of both students and staff, has carefully formulated an advice on a variety of strategic topics related to the educational portfolio in the Physics and Astronomy domain. This advice was preceded by several rounds of consultation among students and staff, ensuring broad support. The ECE advice deals with a variety of educational topics around the BSc and MSc programmes for which the DPA is responsible (listed above), which the core team wholeheartedly supports. Specifically, the ECE advised to:

- Introduce a ‘mostly English’ BSc, suitable for English speakers to attend from year 1.
- Increase student satisfaction, notably the particular choice for a university of enrolment (UvA or VU) should be indiscernible in daily life in all respects: information transfer, end terms, contact persons etc.
- Make students feel they belong to their unique single group at a single location, at MSc level typically associated with a research institute and a master track.
- Make some modifications in and a clear differentiation between master tracks.

2.3 Research areas and initiatives

We very much feel that DPA should be a research institute that predominantly takes initiatives bottom-up, by putting individual faculty in charge of their own research and teaching as much as possible. We explicitly wish to avoid top-down strategies for the future and will not have a command-and-control management system that imposes ways of doing things on the members of DPA. For this reason, our strategic plan does not prioritize any research area or lay out a view of which research directions the DPA will take. These choices should be made by the members, and for large initiatives, by groups of members, who are supported in their endeavours by the DPA leadership and support staff, critically evaluated by a Scientific Advisory Committee. Our plan rather examines what we now think are possibilities for future directions, to show that there are many, but not to restrict ourselves already to certain choices. Similarly, the present research areas have all been externally evaluated as world-leading, and we consequently have no reason to abandon them as long as the members support them. In principle, DPA will cover the full breadth of physics and astronomy insofar as its Institutes and members wish to.

The creation of DPA and the overall closer collaboration between UvA and VU offer the opportunity to explore what further possibilities there are for more inter- or cross-disciplinary work. For the purpose of stimulating such discussion, we divided our research staff into several broad ‘themes’ within which brainstorming could take place. They were chosen deliberately to (1) cross the boundaries between institutes and universities, so as to be orthogonal to the division into Institutes, because within those, strategic thinking about future research is already part and parcel of their operation; (2) connect groups where we expected collaboration opportunities; (3) encompass all the present research, and thus have each faculty member in at least one theme (but free to participate in more than one).

We asked all the researchers in the DPA to identify and name their potential research partners from within the DPA as part of the theme creation. The themes are quite diverse in size, scope, and purpose. Some correspond to themes that we hope will grow into future research focus areas, others are much more ad-hoc and may serve only as discussion forum for seeking strategic directions and collaboration possibilities at this moment. We explicitly do not expect them to be, or evolve into, organizational units of DPA. With these themes the DPA covers the whole research spectrum (fundamental science, science for society and application-oriented research) and is well positioned for external funding such as Gravitation proposals, large EU programmes, AAA funding, etc.

The themes in which the discussions with the staff on future developments were conducted are:

1. Physics of Energy – Solardam
2. Soft Matter and Biological Physics
3. Applied Physics in Life Sciences
4. Our cosmic origins - how did we get here?
5. What is the Universe made of?
6. Amsterdam Quantum Science
7. History of the Exact Sciences

Due to the extensive list of research areas in a collaboration of the UvA and VU departments we refer to our *Collaboration Plan for a joint VU-UvA Department Physics & Astronomy* for a more in-depth description of the added strategic value.

2.4 Rankings and strategic alliances

Physics and Astronomy in the Netherlands is world-leading by any standard, and notably so in several quality assessments. Looking at a number of different rankings such as the QS, THE, Shanghai etc. it becomes immediately clear that individual researchers are almost without exception world-class, being amongst the highest cited in the world. Still, the departments they work in are *not* always internationally recognized as world-leading. The relatively low position in the rankings is invariably due to the much more subjective ‘academic reputation’ that we have. The conclusion is that we have a marketing problem: we are extremely competitive, yet do not end up high in rankings. This is an important fact to act upon, since the low ranking simply makes us less effective in attracting international top students and staff members, who to some extent use these very rankings or just the ‘academic reputation’ to base their career decisions on.

The formation of the DPA is an at least partial solution to these problems. If one looks at what differentiates the Dutch P&A departments from their more famous competitors, it turns out that all of the international P&A institutes that do well in the rankings and are very effective in attracting talent simply have a much larger size. A comparison of the ‘leading’ P&A institutions in Europe are all of a significantly larger size than any single P&A department in the Netherlands. However, bringing UvA P&A together, and joining them with VU Physics, we reach a size that begins to be of the right order of magnitude to aid in getting an excellent academic reputation; this is of course a long process that we will carefully follow.

3. SWOT analysis

A clear advantage of DPA over its present, constituent parts will be a greater critical mass of people and resources. This will allow relatively easier provision of significant high-quality facilities to researchers and students, and better advertising of our qualities and thus better talent attraction. All kinds of things that we now do very little of due to lack of people and resources, such as development of scholarship funds, targeted lobbying for funding and programmes in The Hague and Brussels, highly visible visiting scholar programmes, alumni programmes etc., can and will be further developed by the DPA. Thus, we will create a for Dutch standards unique power house of physics and astronomy with European- and world-wide impact, and explicit recognition of its impact and quality, in which researchers and students will develop and show their talents optimally.

Other than describing the pros and cons of forming the DPA we have chosen to make a SWOT analysis which aims to identify the key internal and external factors seen as important to establish a joint institute. The SWOT analysis is based both on the current strengths and weaknesses of our organizations and the expected future opportunities and threats for DPA as a whole.

3.1 Strengths

1. Fantastic constituent research units that are all excellent (supported by recent evaluations) and that cover a very broad spectrum of Physics & Astronomy
2. Strong embedding in national and international research agendas/plans
3. Much research focused/organized in UvA/VU research spearheads
4. The Amsterdam label helps as a magnet for people/talent
5. Proven competitive strength in attracting (personal) external funding
6. Strong, well-monitored MSc and PhD programs with excellent, successful graduates
7. Broad spectrum in excellent education, attractive because directly linked to the broad research themes
8. Largest BSc Physics & Astronomy in the Netherlands due to merger

3.2 Weaknesses

1. Not all our research programmes are perceived by the outside world as well-known and of high quality, in contrast to what more objective indicators of our strength (citations) indicate
2. Diminished capacity for attracting talent due to the above
3. Relatively small staff combined with high ambition leads to high workload (as measured by the 'perceived workload vs. desired workload' indicator in employee surveys)
4. Poor international visibility for attracting foreign students
5. Relatively low impact on high-level policy making

3.3 Opportunities

1. Leading physics and astronomy campus being created at 'Science Park East' by concentration of physics and astronomy in Amsterdam with many partner institutes
2. Excellent environment for applied physics in life sciences with partner institutes at 'Science Park South'
3. New research opportunities arising from the UvA/VU collaboration
4. More options for valorisation and other forms of knowledge utilization and contacts with industry and society
5. Better marketing may offer 'relatively easy' ways of increasing our reputation, since now that reputation lags behind our true quality
6. Campus is becoming more international in its students and staff population, enhancing the liveliness, vibrancy and quality, and better preparing our students for the international labour market
7. Critical mass and exciting level of campus can be exploited to attract more partners and facilities; attractiveness already proven by SRON/ARCNL
8. Enriching and strengthening our education, and improving its not always high evaluation by students, by joining forces and adopting each other's best practices

3.4 Threats

1. Organizational change (finances, governance) required for a successful DPA is highly complex and the path to a solution is not yet clear
2. The housing plan and its financial implementation are critical and have to be managed well
3. Organizational change creates upheaval and unrest that precedes the benefits, and thus must be executed with great caution
4. Top-down 'command and control' type of governance and expanding evaluation and accreditation culture are time consuming, demotivating, and not useful.
5. The changes in NWO and the disappearance of FOM could pose a serious risk to funding chances and national coherence of P&A research (in particular physics)
6. Similarly, UvA/VU directives and commitment to our collaboration imply significant planning uncertainties
7. Increasing focus on (directly) applicable research is a threat for fundamental science.

4. Next steps and future considerations

A smooth transition between the present situation and the new DPA should be effected, in which staff and students remain happy during the transition period; specifically sudden changes and artificial (dis)incentives due to changing systems are to be avoided as much as possible. This will require careful discussion with and significant support of the participating faculties and university boards.

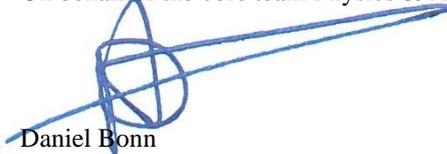
To start the process, from January 2016 a joint management team DPA will meet each month to discuss all strategic issues regarding research, education and important nominations. The joint management team DPA will consist of the entire management teams of all three institutes.

Also starting in January 2016 a program organization will start the preparations for the next step, which will be the preparation for the final decision to establish a joint institute. The Roadmap describes all the necessary steps to be followed for the due diligence, governance regulations, financial budgeting, administrative procedures, project administration, terms of employment, housing, etc.

If desired, we would of course be happy to explain or discuss our Collaboration Plan in a meeting with the works council.

Kind regards,

On behalf of the core team Physics & Astronomy,



Daniel Bonn

Cc: vice deans FNWI, FEW/FALW; Gert Grift; other members core team: Johan Gemser, Annemarie van Groenestijn, Joost van Mameren, Wim Vassen, Ralph Wijers, and Gijs Wuite; DT-IoP; MT VU physics; MT-API