Perspectief

Building on Transient Plasmas (BTP) 26 January 2009

Call for pre-proposals for *Building on Transient Plasmas*

The challenge

Plasmas are partially ionized gases. Plasmas exist in nature, but they can also be produced by man, and serve for a widespread range of applications: from semiconductor processing to environmental applications. In many applications, transient plasmas can perform much better in processing precision and energy efficiency than continuous plasmas, or they even can offer unique new features. The current lack of fundamental understanding of these transient phenomena, however, limits reproducibility and process control, which in turn prevents wide scale implementation. This program will provide the scientific background needed by the industrial partners to reliably apply transient discharges in their products and production processes. Academic researchers are invited to submit pre-proposals. Aiming at a direct link between public research centres and the industrial world, BTP projects should have at least one industrial partner that participates substantially (cash and/or in-kind) in the research. The contributions of the industrial partners should add up to 25% of the total project costs if expressed in financial means.

Research topics

Proposals of transient plasmas and transient phenomena in plasmas in almost all technological areas are acceptable.

Within BTP, the following technological areas will be stimulated with descending priority:
- Treatment of gases
- Photons: lighting, laser and EUV technology
- Treatment of surfaces
- Lightning

The main criteria for assessment whether a specific project application falls within this program is the following:
- The project is based on a transient plasma or on transient phenomena in plasmas.
- The transient nature is essential for the process itself or for a considerable enhancement of the efficiency
- The project is based on a collaboration between two academic groups and at least one industry.
- The project contains experimental characterizations, but also theory and modeling activities. Projects with exclusively theory and modeling, without connection to experimental work, are not acceptable.

The following categories of plasma technology are not eligible for funding under this program:
- Continuous plasmas with no transient phenomena
- Transient plasmas or transient effects which are not relevant for the application
- The transient thermonuclear plasmas in fusion technology

Application fields

Transient plasmas are applied (and can find new applications) in many technological areas. In the following we will address four technology areas and present some targeted results which this program is aiming at.

- ***Environment:*** In The Netherlands, the interest of SME's for transient plasma technology is rapidly increasing. To a large extent, these activities center around environmental technology: the application of transient plasmas (mostly corona discharges) for the removal of poisonous, environmentally hazardous, or foul smelling components in exhaust gases and waste water.

- *Targeted results:*
  - Improved performance of corona reactors and dielectric barrier discharges which are used for the treatment of flue gases and the generation of oxygen radicals and ozone. The industrial partners in this program will be able to launch new products and build up and broaden their market share.
- ***Light and radiation:*** Plasmas are able to generate light and radiation at the desired wavelengths in an efficient way. In many cases, transient phenomena play an important role in the efficiency of the final industrial process.

- *Targeted results:*
  - Better understanding of the starting of HID lamps. Under some conditions, these lamps ignite very well, under other conditions not at all. Understanding the underlying physical principles is vital to overcome the industrial complications. Proper ignition of the lamps is also a key issue in the everlasting efforts to increase the energy efficiency, which may lead to direct, substantial, energy savings.
  - New concepts for mercury free lamps.
  - New plasma sources for the generation of EUV radiation for next generation lithography machines. Magnetically pinched plasmas in Sn vapour are explored for this technology. The extreme conditions during the transient phase of these plasmas result in several industrial problems like the generation of (lots of) Sn vapour and other kinds of debris which contaminate the machine. Laser produced plasmas are considered at this moment.

° High Harmonic Generation based EUV sources for spatial and temporal control of EUV and XUV free-electron lasers (FELs: e.g. Fermi@Elletra, Trieste, Italy).
° Better control of the transition between the filamentary and the uniform discharge mode in atmospheric pressure plasma processing or for high-beam quality excimer lasers.
° New plasma sources in waveguides and transient plasma sources of electrons and ions

• ***Surface processing:*** Another application area is the processing of surfaces using transient plasmas.

- *Targeted results:*

° New processes for skin treatment based on a matrix addressable plasma tool, which uses the transient behavior of the radicals produced by the plasma in an intelligent way.
° New industrial processes for the treatment of medical tools, protective clothing, textiles, plastic electronics, and glass, based on transient plasma technology.

• ***Lightning:*** Lightning is a powerful natural phenomenon, which causes a lot of damage, in particular, for all the microelectronic components that become increasingly important in our daily life. Lightning is a very clear example of a transient plasma; its early stages consist of corona discharges. High power sparks fall in the same category.

- *Targeted results:*

° X-ray sources based on laboratory produced lightning strikes.
° Improvements in lightning protection.
° New, much more reliable, switches, feedthroughs, and isolators for high voltage applications.

Further details about the BTP program can be found in the extensive program description.

Budget

For this call a budget of 4.6 M€ is available which must be matched by the contributions of potential technology users (companies/institutes) to a total of at least 6.1 M€. The maximum of project costs that can be requested from STW is € 750.000 per project. A contribution of potential "users" of at least 25% of the total project budget is compulsory and adds up to the requested amount.
The users do not have to co-finance up-front in the program but may contribute in-kind (materials, equipment, facilities etc.) and/or financially in the project wherein they will participate.
To realize the ambitions and cohesion of the program a budget of 70 k€ for conferences, workshops and events will be reserved on program level. This funding will be made available by the STW board upon advice of the program committee.

Who can apply

Scientists employed by Dutch universities or institutes recognized by NWO are eligible to submit a (pre-) proposal (see OTP-guidelines of STW for eligibility criteria). Since BTP is a multidisciplinary program, projects which involve two or more research groups with different backgrounds (e.g. mechanical engineering/chemical engineering, applied mathematics/physics) are preferred. In the project description it should be made clear what the added value of the multidisciplinary approach is for the project.

Proposals and selection

The selection of proposals will be done in two steps: a call for pre-proposals and an invitation to the applicants of pre-proposals to submit full proposals. The pre-proposals will be evaluated by the program committee. The STW board will decide on the funding of the full proposals.

Funding

Project grants will cover:
• personnel costs (including OIO's, postdocs, technical assistants and programmers)
• material costs (including national travel costs)
• international travel costs
• costs for equipment

The institution(s) of the applicant(s) ensure(s) the required infrastructure, the supervision and the fitting into the research program of the research institute. STW may verify this with the dean or the executive board of the institute.
The expertise required for the research must be available at the requesting institute(s), so that external consultants will not be necessary. When foreign universities and institutes that cannot apply for STW-funding (e.g. TNO) are involved in the program, these parties take care of their own funding.

How to submit?

In order to minimize the time needed for writing and evaluating the proposals, it is compulsory to submit a preliminary proposal. All pre-proposals must be written in accordance with the formal guidelines that can be found in the call for pre-proposals. Only pre-proposals written in English and in accordance with the guidelines will be accepted for evaluation. **Pre-proposals should be sent by email to STW (info@stw.nl)**. Pre-proposals should be submitted to STW **before Monday 2 March 2009, 24.00 hrs**. Pre-proposals submitted after this deadline will not be accepted.

Pre-proposals

Pre-proposals should contain a short description (3 A4) of the proposed research, utilization paragraph and estimated budget. The proposal should make clear which potential users will contribute to the project. Support letters are optional for the pre-proposals but can be included (letters of intent are accepted).

The pre-proposals will be ranked by the the program board on the basis of how well they fit within the scope of the program. The members of the program board will first assess the pre-proposals individually before dicussing them plenarily in the board. The program board will advise the applicants 1) to submit a full

proposal or 2) to adjust the proposal so that it would fit better into the program or 3) not to enter the subsequent selection procedure.

Full proposals

Full proposals must consist of a detailed description of the expected results, planning of the research and a utilization paragraph. The utilization paragraph should include the important industrial challenges that will be solved, the time frame to implementation and the expected bottle-necks during the implementation. Companies and institutes, which will potentially contribute, should be involved bottom-up during the preparation of the proposal.

A full proposal will be evaluated only if it is preceded by a pre-proposal.

The scientific quality and the utilization perspective of the full proposals will be evaluated individually by peer review. An independent jury of about eight (inter)national experts of universities and industry (applicants will be excluded) will rank the full proposals.

Each jury member will give 3 marks for each proposal: one for scientific quality, one for utilization potential and one for the strategic fit within the program. The marks will be averaged with equal weight to one final score for the proposal which determines the ranking. In addition to the ranking by the jury the program committee will formulate an advice on the cohesion between the project proposals and their relevance for the program. The decision of the STW board will be based on the ranking by the jury and the advice of the program committee.

The guidelines for full proposals are based on the "Open Technology Program (OTP)" with as main difference that the potential technology users (companies/institutes) should contribute for at least 25% of the total project costs. The proposals should therefore be accompanied by a 'letter of participation' in which the contribution has been made explicit and in which details are given on what, when and how these contributions will be made available. For more details see "richtlijnen voor het open technologieprogramma" (www.stw.nl).

Time schedule BTP proposals

Call for pre-proposals open	Mon 26 January 2009
Deadline pre-proposals	**Mon 2 March 2009, 24.00 hrs.**
Notification to applicants pre-proposal of the positive/negative advice to submit full proposal	Tue 17 March 2009
Deadline full proposals	Mon 18 May 2009, 24.00 hrs.
Start review by experts	Mon 25 May 2009
Protocol sent to applicants	Fri 28 Aug 2009
Deadline comments applicants	Fri 11 Sept 2009
Proposals sent to jury	Mon 21 Sept 2009
Ranking by jury ready	Mon 12 Oct 2009
Advice Program Committee to STW board ready	Fri 23 Oct 2009
Decision by STW board on funding + notification to applicants	Fri 6 Nov 2009

Program Committee

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Appendices

Annex 1: The pre-proposal

For future reference only:

Annex 2: The full proposal
Annex 3: Assessment and selection criteria
Annex 4: Assessment and selection procedure
Annex 5: Utilization
Annex 6: Procedure after granting

Possibility of appeal

The applicant may appeal against a decision of the STW board by sending an objection letter including a motivation and argumentation to the general board of NWO within six weeks after the date of the granting or the rejection letter. Address: Algemeen Bestuur van NWO, Postbus 93138, 2509 AC Den Haag.

Annex 1 The pre-proposal, deadline 2 March 2009, 24:00 hours

The project outline - which must not exceed 3 pages – should be written in English with minimum font size 10 point.

STW receives your proposal by e-mail (info@stw.nl) in doc or pdf format.

The structure must be as follows:

- Mention on the front page 'Perspectief Building on Transient Plasmas' in the upper left corner
- Title
- Names and addresses of the applicants
- Present expertise of the applicants
- Fit within the topics of the program
- Main goals of the project
- Concise description of the planned research. At least a description should be given of the expected results and the implementation thereof in industry
- Names and addresses of the industrial partners of the project, if possible the names of the contacts within the companies
- Support and involvement of the industrial project partners to this research project (qualitatively and quantitatively)
- Preliminary budget (with a maximum STW contribution of € 750.000). The partner contribution is at least 25% of the total project cost.
- References

Upon receiving a pre-proposal STW will decide on its admission (eligibility criteria). The program committee will assess the strategic fit within the research program and its topics. Each individual program committee member will give a mark for the strategic fit for each proposal. Then, in a plenary session the program committee will discuss all pre-proposals and formulate an advice to the applicants. This advice can be: 1) to submit a full proposal or 2) to adjust the proposal so that it would better fit into the program or 3) not to enter the subsequent selection procedure.

The program committee will evaluate the fit of the pre-proposals within the framework of the program and will use the following considerations:

- How well do the goals of the project fit within the ambitions of the program. Do the expected results meet the industrial needs in the long term (2013-2017)?
- To what extent does the proposal fit within the research topics of the program?
- Does the program strengthen the Transient Plasma expertise in The Netherlands in general and of the participants in the project in particular?
- To which extent is the project proposal multidisciplinary? What are the positive effects from the interdisciplinary cooperation? How is interaction in between researchers and between university and industry organized?
- Do the proposals overlap each other and if so, what are the consequences for the funding?

Annex 2 Format of the full proposal *(for future reference only)*

STW receives your proposal by e-mail (info@stw.nl) in doc or pdf format.

- *Mention on the front page 'Perspectief Building on Transient Plasmas' in the upper left corner + STW dossier number*
- *The maximum length is approximately 12 (twelve) pages of A4,* ***with minimum font size 10 point***
- *The proposal and support letters must be written in English.*

Administrative data

On maximally half a page you should provide:

- Title. The title of the project has a maximum of 225 characters. For publicity purposes, a short, non-technical title or acronym is required as well.
- Name, address, phone number, fax number and e-mail address of the applicants and possible co-applicants and the telephone number of the secretary.
- STW sends the official correspondence to the main applicant. This is the first applicant mentioned. STW assumes the main applicant will have the supervision on the project. He or she becomes the project leader and bears the final responsibility for the execution of the research and the utilization plan.
- Applications elsewhere. If support has been applied for elsewhere, you should give the status of this application at the time of submission.

Project description

1. Summaries

The summaries should be clear to those active in the field.

Research summary

Summarize in half a page the context, problem statement, research method and expected results.

Utilization summary

Summarize the utilization potential of the expected results in half a page. Provide everything the reviewers should know about the utilization: the chosen approach, the chosen partners and the way results will be brought into practice.

2. Composition of the group

The current group

Describe in half a page the composition of the team (academic and industrial) that will perform the research as well as the reason this team is fit for this research. Indicate the supervisors of the project, the proposed staff, and how the tasks will be divided.

Available infrastructure

This information includes available laboratory room and equipment.

Candidate researchers

In case candidates for the proposed staff positions are already known, you mention them here. Give a short explanation of their suitability.

3. Scientific description

In this section of maximally four pages an expert in the field should find all information to assess the quality of the proposed research. Treat the following subjects:

Contents of the research

Provide the scientific objectives, the starting-points and the substance of the project. Describe the methods and techniques you will apply, the available knowledge in the team, the knowledge to be developed, and the instruments and models you will use for this. In-kind support of potential users must be an integral part of the research project.

Required personnel and equipment

Provide motivations for staff and equipment and possible other requirements for the research.

Time schedule and allocation of tasks

Describe the proposed course of the research over the years and how the different parts must interact. You give decision points (milestones) and moments research results are expected (deliverables). Further, you indicate which partner will perform which tasks.

STW will ask for a so-called “project plan” for all rewarded full proposals. This should contain a more detailed planning and budget.

Connections with other research

Mention similar research that is performed elsewhere, either in the Netherlands or in the rest of the world. Describe the relation with your own research and the contacts with these groups (or the plans to establish them).

4. Fit within the research topics of the program

Describe explicitly the fit of the proposal in the program and its research topics. These topics are described on page 1 of this call and in chapter 4 of the BTP program description . The program committee will use this section particularly for the assessment of the fit in the program.

5. Utilization plan

The utilization plan must be clear to those with general knowledge of the application domain.

The challenge from the practice and the proposed solution

Your research will address problems encountered in industry with not-yet-existing solutions. Indicate the industrial relevance of this problem and the impulse this research gives towards the solution. Indicate which steps you will take to bring the research results into actual practice. Provide details for assessment of the feasibility and the conditions for successful application.

The users committee

All BTP projects will have “users committees". For further information on this you are referred to the STW website (see Open Technology Program) and the BTP webpage (‘work in progress’). Mention the contact persons from companies and organisations that already accepted invitations to join the users committee, or that are willing to co-operate in another relevant way to realise utilization of results.

Past performance in utilization

Indicate the past successes that the academic team achieved in bringing academic research results into industrial practice, in relation with transient plasmas or otherwise.

6. Contracts and patents

If there are any contracts relevant to the proposed research project, these should be mentioned here. Also provide patent search results, or the reason why such a search is not necessary for your proposal. Indicate if you have patents or running patent applications in the field of the research. This section takes maximally half a page.

7. Budget

In the main document you find a general explanation on which costs are considered for financing by STW and which are not. All amounts are without BTW (VAT). The length of this section is at maximum one page.

- ***Personnel***
  You can apply for temporary staff: PhD-students, post-docs or technicians. Staff is appointed by the executive institution. The actual appointment is subject to prior written permission of STW. STW may withdraw a grant if vacancies are not filled within a year after granting. The rates for staff can be found at www.stw.nl → infobalie
- ***Materials***
  The costs of office and laboratory goods, small instruments and appliances must be specified here. National travel expenses of the project are also part of this budget.
- ***Foreign travel expenses***
  These are costs for foreign travel and subsistence for congress visits abroad for the project.
- ***Investments***
  These are costs for necessary equipment and other investments for the project.
- ***Contributions of partners***
  Provide financial and technical (staff and material) contributions that the partners bring to the project. After granting STW will invoice the financial contributions and add them to the corresponding credit of the project. Present details on the capitalization of in-kind contributions as well. For in-kind staff contributions the maximum rates are 106 €/hr for senior staff and 75 €/hr for staff up to HBO-level. For material contributions, please explain the capitalization.
- ***Overview of the total project costs***
  Present a table with the planning of the staff appointments and the budgets per project year. Use the above mentioned headers. The partner contributions must be specified separately. The total project costs are the costs for STW as well as the contributions of the partners. The contribution requested from STW is at most 750.000 €. The partner contributions are at least 25% of the total budget.

8. Literature

In maximally two pages list all relevant and publicly available publications of the participating parties of the proposal, as well as relevant publications of others.

9. Key words, abbreviations and acronyms

Appendix: Confirmation letters.

These participation letters written by competent partner authorities, officially state their technical and financial contributions and their interest in the project.

Appendix: Potential referees.

(not to be included in the proposal; please submit on separate page)

List four (inter-)nationally renowned referees that could potentially review your proposal. The referees should be able to review the proposal objectively and therefore should not have participated as co-author in publications of the applicants.

Annex 3 Assessment and selection criteria

Full proposals will be evaluated by peer review on scientific quality and utilization potential.

Scientific quality

- Originality and innovative character of the proposal
- Contribution to the aims of the Perspectief program
- Expected impact on the scientific community
- Research method
- Time schedule
- Budget
- Infrastructure

Utilization

- Potential economic impact
- Past performance in utilization by the applicants
- Contribution to the development of applied knowledge and aims of the program
- Impact on utilization if the project is carried out successfully
- Different steps needed (time path) to utilize the results
- Chance on patents and/or know how agreements
- Participation of users

Thereafter, the jury will be asked to assess the proposals on these aspects and also on the strategic fit within the program, see annex 4.

Annex 4 Assessment and selection procedure

Check of the project proposal by STW

The STW office confirms the receipt of every proposal. A general check is performed whether or not the proposal satisfies all requirements as mentioned in this document as well as the freedom to operate rule of STW. In case of doubt the office will contact the applicant and may ask for a revised version.

Peer review

STW presents the proposal to a number of experts in the field of the proposal. These referees are from the scientific community, knowledge institutes and relevant industry. They will review the proposal on the basis of criteria for scientific quality and utilization potential. These criteria are stated in Annex 3. Per project the comments of at least four referees will be used

STW will combine the comments of the referees in a protocol. In this protocol the comments of the individual referees are made anonymous.

Reply by the applicants

STW will send the protocol to the main applicant requesting to react to the comments of the referees. Applicants may add possible project changes to the protocol in such a way that it is clear which comments have resulted in which changes in the proposal.

Assessment by the jury and program committee

An independent jury of about eight (inter) national experts of universities and industry (applicants will be excluded) will rank the full proposals. Each jury member will give 3 marks for each proposal: one for scientific quality, one for utilization potential and one for the strategic fit within the program on a scale from 1-9. The marks will be averaged with equal weight to one final score for the proposal which determines the ranking. In addition to the ranking by the jury the program committee will formulate an advice on the cohesion between the project proposals and their relevance for the program. The decision of the STW board will be based on the ranking by the jury and the advice of the program committee.

Possibility of appeal

The applicant may appeal against a decision of the STW board by sending an objection letter including a motivation and argumentation to the general board of NWO within six weeks after the date of the granting or the rejection letter. Address: Algemeen Bestuur van NWO, Postbus 93138, 2509 AC Den Haag.

Annex 5 Utilization

A very important aspect is the utilization of the project results in industrial practice. Two mechanisms exist here: partners and users.

Partners

Partners are companies that participate actively in the project execution by means of financial or technical (material and/or staff) support. The contributions of the project partners are an integral part of the project and are stated explicitly in the project proposal. Confirmation letters of the partners are attached to the project proposal. Partner contributions are the main indication for the importance of the research to the partners and for their intention to utilise the results. Therefore partners are seen as users by definition.

Users

Users are interested parties that can potentially use the project results. They are allowed to take knowledge of the progress and results of the research performed. They can be companies, authorities, research institutes, but also consumers or end-users. Users help to make sure that the research is performed as should be and to justify grants from the public sector. For protection of the intellectual properties of the partners it may be necessary for the users to sign a non-disclosure agreement.

The project proposal should mention potential users.

Users committee

STW research is funded largely from public resources. Therefore a proper inspection of the progress and the effectiveness of the research is required. Moreover, the knowledge from the research should be transferred to the community in an optimal way. Therefore, STW demands for all research projects a users committee. Apart from partner representatives, this committee will consist of the users mentioned before and one representative of the program committee. The users committee is composed by the project leader in consultation with STW. Exclusion of users from the users committee is only possible on explicit, substantiated request of an (industrial) partner that delivers a significant contribution to the project.

Knowledge management

Knowledge management is the regulation of the property, the protection and the exploitation of knowledge. Partners and members of the users committee are first in line for gaining knowledge from the results of the research, but they have no rights to exploit or commercialise this knowledge. To gain such rights a “reasonable compensation” has to be provided.

A well-known and generally accepted measure for knowledge protection is the request for a temporary ban on the publication of particular results. This may be required for e.g. the submission of a patent.

For the BTP program the STW rules apply, see http://www.stw.nl/Over+STW/Kennishandelbeleid.htm

Annex 6 Procedure after granting

During the course of a project the following procedures apply. Extensive information is available in the ‘Aanwijzingen voor de projectleider’. This document will be enclosed in the letter awarding the grant. It is also available from the STW office.

Granting

The main applicant becomes the project leader, unless otherwise indicated in the project proposal. After granting, the project leader obtains a number of documents in which the legal and financial conditions are stated. The grant is available only after these documents have been signed and returned to the STW office.

Initially, the credits for materials, travel and investments are granted only for the first two years and the staff is granted only for the first three years. STW reserves the remaining budget for the “Request for project continuation” after two years.

Project plan

After granting, the project leader should write a project plan as an appendix to the proposal, containing a more elaborate planning and task scheduling, including the in-kind contribution of the partners. The project plan contains a rolling forecast: At least once a year and whenever necessary the project plan is adapted to the situation. The next year is planned with most detail. The project plan is written together with the partners and is presented to STW as well as the users committee..

The commitments of the project partners to the execution of the project as put forward in the project plan may form a project contract between the partners and STW. A detailed division of tasks is given.

Start of the project

The budget is available from the moment that the abovementioned documents are received by STW. The start date of the project is the date of the appointment of the first staff member. Usually, this is not the date of granting.

Users committee en reporting

Approximately six months after the start of the project the users committee will meet for the first time. Hereafter, the committee will meet once or twice a year to discuss the progress. The users committee will receive all scientific publications for approval prior to publication. They will also receive all progress reports.

The project leader reports semi-annually on the progress of the research to the STW office. The representative of the program committee reports to the program committee on the progress of the project in terms of issues and recommendations.

Contribution to the programme

Each project will contribute to the coordinating and cohesion stimulation activities as decribed in the program plan and as will be developed by STW and the program committee during the course of the program. Examples are the attendence and presentation of project results on annual program meetings, input for the design toolkit, etc.

Continuation of projects

For projects that last for three years or longer, the project leader must submit a continuation request one and a half year after the start of the project. To decide on the continuation STW will be advised by the users committee.

Termination

Termination of projects before the official final date is possible if the commitments are not fulfilled (anymore) or if the scientific quality of the research or utilization is below the required level.