

Collaborative research projects involving more than one institution, as well as basic work in support of the Scientific Discovery through Advanced Computing initiative, are encouraged. Applications submitted from different institutions, which are directed at a common research activity, should clearly indicate they are part of a proposed collaboration and contain a brief description of the overall research project. However, each application must have a distinct scope of work and a qualified principal investigator, who is responsible for the research effort being performed at his or her institution. Synergistic collaborations with researchers in federal laboratories and Federally Funded Research and Development Centers (FFRDCs), including the DOE National Laboratories are also encouraged, though no funds will be provided to these organizations under this Notice. Further information on preparation of collaborative applications may be accessed via the Internet at: <http://www.science.doe.gov/production/grants/Colab.html>.

Since we expect that reviewers will be asked to review several applications, those applications from individual PIs or small groups (1–4 people) should be limited to a maximum of twenty (20) pages (including text and figures) of technical information, while applications from larger theory groups should be limited to thirty (30) pages. The PDF file may also include a few selected publications in an Appendix as background information. In addition, in the electronic submission, please limit biographical and publication information for the principal investigator and senior personnel to no more than two pages each. Each principal investigator should provide an E-mail address.

In addition to the information required by 10 CFR part 605 each application should contain the following items: (1) A succinct statement of the goal of the research, (2) a detailed research plan, (3) the specific results expected at the end of the project period, (4) an analysis of the adequacy of the budget, (5) a discussion of the impact of the proposed research on other fields of science, and (6) for projects requiring significant computational resources (*e.g.*, at the National Energy Research Scientific Computing Center), an estimate and justification of the resources that will be required.

#### Merit Review

Applications will be subjected to formal merit review and will be

evaluated against the following criteria, which are listed in descending order of importance as set forth in 10 CFR part 605 (<http://www.science.doe.gov/production/grants/605index.html>).

1. Scientific and/or technical merit of the project,
2. Appropriateness of the proposed method or approach,
3. Competency of the applicant's personnel and adequacy of the proposed resources,
4. Reasonableness and appropriateness of the proposed budget.

Scientific and technical merit also includes the importance and relevance of the proposed research to the U.S. fusion program. Accordingly, preference will be given to work based in the U.S.

In addition, proposals from theory groups will also be rated on the synergy of the group and the management of the group. With respect to synergy, the criteria are:

- (1) Clear evidence of collaborative work.
- (2) The extent to which the group addresses difficult problems requiring a team effort.

With respect to management the criteria are:

- (1) Clear evidence of scientific leadership.
- (2) The extent to which the management evaluates the relevance and scientific impact of the group's work.

The Office of Fusion Energy Sciences shall also consider, as part of the evaluation, other available advice or information as well as program policy factors, such as ensuring an appropriate balance among the program areas and within the program areas, ensuring support for major computational efforts, ensuring support for experiments, and quality of previous performance.

Selection of applications/proposals for award will be based upon the findings of the technical evaluations, the importance and relevance of the proposed research to the Office of Fusion Energy Sciences' mission, and funding availability.

#### Program Specific Information

##### 1. Magnetohydrodynamics and Stability

Grant applications are solicited for new research or continuation of past efforts in magnetohydrodynamics (MHD) theory in support of work on magnetically confined fusion plasmas. Current areas of interest include advanced tokamak (AT), innovative confinement concepts (ICC), burning plasma physics and steady state, high-beta plasma issues. Both analytical and computational approaches will be

considered. Additional work is needed on nonlinear MHD codes to include new physics, such as extended MHD (including flows and various non-ideal MHD effects), resistive wall modes, and particularly neoclassical tearing modes. Finally, basic work in support of the Scientific Discovery through Advanced Computing initiative that involves the development of large-scale MHD codes will also be considered.

##### 2. Confinement and Transport

Applications will be considered in the area of confinement and transport in plasmas. This area covers plasma turbulence, energy, particle, momentum and radiation transport in the core of the plasma and theory based transport modeling. The work of interest includes work in support of tokamak as well as non-tokamak innovative concepts. Topics of interest include among others, electromagnetic effects on turbulence, shear flow generation and its impacts on transport, and understanding of the role of collisions in turbulent plasmas. Both analytical and computational work is of interest. Basic work in support of the Scientific Discovery through Advanced Computing initiative that involves the development of large-scale codes to explore turbulence will also be considered.

##### 3. Edge and Divertor Physics

Applications will be considered in the area of edge physics theory. This area covers edge plasma turbulence, energy, particle and radiation transport in the edge of the plasma and in the neighborhood of the separatrix. The work of interest includes neutrals transport in divertors and plasma edge region, atomic physics processes affecting temperature, radiation and flame front propagation in divertors, and pedestal and Elm theory and modeling. Both analytical and numerical models are of interest. Techniques and algorithms for modeling fast particles in the edge region as well as adaptive grid methods and their application to modeling of plasma turbulence and transport in the edge region will be considered.

##### 4. Plasma Heating and Non-inductive Current Drive

Applications will be considered in the area of radio frequency (RF) physics in plasmas. This includes RF propagation, heating and current drive. Of interest are both analytical and numerical treatments of interaction of plasmas with radio frequency waves. These include electron cyclotron, ion cyclotron, lower hybrid, and Bernstein waves. Topics of interest include,