



Associazione Euratom-ENEA sulla Fusione

To: *Heads of Research Units*
c.c.: *EFDA Leadership*
Consorzio RFX Technical-Scientific Committee
Heads of RFP laboratories
Consorzio RFX team and collaborators

Padova, January 8th, 2010.

SUBJECT: Call for proposals to participate in the 2010 RFX-mod programme

Dear Colleagues,

it is a pleasure for us to invite your institutions to participate in the 2010 RFX-mod scientific programme. As a part of the global programme of Consorzio RFX, it has been examined and approved by the Technical-Scientific Committee

RFX-mod is a flexible reversed field pinch (RFP) device, capable of addressing problems at the leading edge of fusion science, with strong interaction with tokamak and stellarator physics.

RFX-mod is equipped with a state of the art system for active control of MHD stability: 192 coils, each independently driven and feedback controlled cover the whole plasma surface. Various coil settings and algorithms for mode control can be developed in several plasma configurations, including tokamak. A portfolio of modern plasma diagnostics supports operation.

The recent experimental campaigns were extremely successful, with a number of high-quality results, which significantly advanced the understanding and the fusion perspectives of the RFP: among them the discovery of improved performance helical states with strong electron transport barrier, which is leading to intense collaboration with the stellarator community - and the advancements in active control of MHD stability - with fruitful collaborations with the tokamak and the production of preliminary results on feedback control of the (2,1) mode in low q_{edge} tokamak plasmas-.

Starting from these achievements, and considering the guidelines provided by the seven missions identified in the EFDA work plan, the 2010 RFX-mod science & technology programme fits into four main headlines which will shape the long term strategy of the laboratory:

- ***Exploring RFP improved confinement scenarios.*** This requires improving the knowledge base on the high current, high density helical regime. A strong effort will be dedicated to experiments to improve first wall conditioning/recycling control (with the use of lithization and boronization) and plasma fuelling in high current (up to 2 MA), helical conditions.
- ***Contributing to the fusion community effort on active control of MHD stability, also by the realization of mode control experiments in RFX-mod tokamak plasmas.*** Effort will therefore be dedicated to RWM stabilization and Tearing Modes and mode locking control in both RFP and tokamak configuration, development and test of new control algorithms, simultaneous control of multiple modes, tests on mode rigidity and on active coil geometries, ITER relevant code benchmarking...
- ***Contributing to the advancement of fusion science:*** integrated scenarios with edge and core transport barriers, exploiting similarities with advanced regimes in tokamak and stellarator; study of transport and stability in helical fields; contribute to the development of physics of 3d magnetic fields; test tokamak physics at low field and improve predictive capabilities for the "numerical tokamak".
- ***Performing experiments finalized to explore and answer open issues for the upgrade of the existing RFP devices and for conceptual design of new ones.***

Consorzio RFX is strongly committed to provide, with RFX-mod, a facility open to the needs of the international fusion communities, and to realize an experimental programme fully integrated in the European effort for fusion and in the international RFP strategy.

We would like to underline the educational policy pursued by Consorzio RFX. With a strong and organic link with the University of Padova, both at the undergraduate and Ph.D. level, with the European Ph.D. programme, and with a young and motivated team, Consorzio RFX represents a very good opportunity to train students and young researchers.

The 2010 scientific programme will be organized with a Task Force structure. Each task force will be responsible for the coordination and execution of a part of the experimental programme.

The task forces proposed for 2010 are:

	Task Force Topic	Task Force Leaders
TF 1	MHD stability active control in various magnetic configurations	Giuseppe Marchiori David Terranova
TF 2	Density control and plasma-wall interaction	Paolo Franz Gianluca Spizzo
TF 3	Physics integration for high performance RFP	Rita Lorenzini Nicola Vianello
TF 4	Scenario optimization and development for present and future RFX operation	Roberto Cavazzana Loris Zanotto

A plasma operation support team, led by S. Dal Bello and L. Novello, will support the science programme.

Given this background, we invite you to make new proposals for *experiments, data analysis and interpretation activities*. The template for presenting proposals is attached at the end of the document (.pdf) and as a separate MsWord document. Proposal fitting the aforementioned four headlines are strongly encouraged.

Proposal should be sent via e-mail to the address: proposals@igi.cnr.it

You are welcome to indicate whether you have a preferred time for executing your proposal. We are committed to provide all necessary technical support for remote access to RFX-mod data and analysis tools.

You are also welcome to contact the relevant task force leaders and ourselves for any information you might need.

We would appreciate receiving your proposals **by February 6th, 2010.**

A programme seminar, open to all proposal authors and to colleagues interested in collaborating with the RFX-mod experimental programme, will be held in Padova **from February 10th to 12th, 2010.**

Yours sincerely,

Piero Martin
Head of RFX scientific programme

Maria Ester Puiatti
Deputy Head of RFX scientific programme

ANNEX 1: contact details

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ANNEX 2: RFX-mod 2010 experimental proposal form

TITLE:

Proposer(s):

Proposed task force (check only ONE): TF1 TF2 TF3 TF4

Does this activity require machine experimental time? Yes No

Approximate number of experimental days required (if applicable)

Preferred date for execution (if machine time is required):

1. Motivation

2. Experimental details

if machine time is required only

2.1. Global plasma parameters

2.2. Special diagnostic requirements

2.3 Special machine requirements and scarce resources

3. Measurable objectives

External submitters may leave these fields empty, they will be filled later by the relevant Task Force leader

Check one or more of the boxes and fill in the corresponding fields.

3.1. Model Verification & Validation

(indicate type of model to validate and maximum acceptable errors)

3.2 Measurement of properties

(indicate quantity to measure, and expected errors and/or range)

3.3 Description of a structure

(indicate the structure you want to investigate and/or the additional information you want to obtain)

3.4 Exploration of a state

(Indicate the limits in the operative space you intend to explore, or the parameter scan you intend to perform, or the new type of state you want to detect)

Review of objectives/requirements (to be filled by RFX-mod management)

Are objectives and requirements well defined?	Yes <input type="checkbox"/> No <input type="checkbox"/>
Is the proposal feasible within the abilities of the organization ?	Yes <input type="checkbox"/> No <input type="checkbox"/>
Date	Reviewed by
Is this proposal a priority for experimental year 2010?	Yes <input type="checkbox"/> No <input type="checkbox"/>
Date	The Head of RFX scientific programme