



MEMORANDUM

From: Craig Petty, Experimental Science Director
To: DIII-D Team
Date: September 12, 2023
Subject: Revised DIII-D Research Opportunity Forum Process

Dear DIII-D Team,

This memo discusses the major elements of the revised Research Opportunity Forum (ROF) process for the 2024-2025 experimental campaign. While a few elements are unchanged from previous ROFs, several new processes have been introduced with the goal of a more continuous experimental planning process that is open to a broader spectrum of people and has a fair and impartial evaluation of proposals. Two significant changes in particular are that more detailed proposals will be required up front, and the scientific and technical merits of the proposals will be evaluated using a dual-anonymous review process ahead of the ROF group breakout meetings. All proposals, except Frontiers Science, Torkil Jensen and Directors Reserve, will be subject to the below review process.

1. Preliminary ROF Calendar

Timeline:

Est. time	ROF element
Aug 1 – Sep 14	Strategic Planning Workshops
Sep 12	People can begin to “opt in” as an anonymous reviewer
Sep 19	ROF Proposal Engine opens
Oct 2	Research Council meeting
Mid Oct	Run Time Guidance memo issued, ROF categories finalized and EoI announced for thrusts and task forces
Oct 16 – Nov 3	IAEA, ITPA and APS meetings
Sep – Nov	DIII-D Team writes and submits ROF proposals: 3-5 pages plus answers to the “40 Questions”
Dec 1	Proposal submission deadline to be considered for FY2024 (proposal engine will remain open)
Dec 22	Finish all anonymized reviews of proposals eligible for FY2024



Early Jan	Education Committee decides on Ph.D. student recommendation
Jan 3 – Feb 9	ROF breakout sessions, groups produce list of prioritized proposals
Feb 19	Run Time Allocation memo issued
Feb 23	Group Leaders finalize prioritized and approved experiment lists
Feb 29	Call for final answers to the “40 Questions”
Mar 8	All “40 Questions” must have final answers from MP team
Mar 22	Run Coordinator Team makes experimental schedule
Mar 25 - Apr 5	MPs for first experiments modified and SPR’s complete
Apr 8 - 19	MPs for first experiments reviewed by Area, OPS & Final leaders

2. Strategic Planning (aka Setting Group Goals):

Strategic Planning Workshops (SPW) are an important starting point in planning the upcoming DIII-D experimental program. Groups will meet to discuss goals and high priority research efforts in their area over the next ~2 years. Each of the DIII-D Research Groups should organize their own SPW; there will be an additional SPW session organized by the DIII-D Research Director, open to all, where people can propose “cross-cutting” research tasks that bridge Research Groups. These discussions should be “brainstorming” in nature and need to focus on main themes and not individual experiments. The aim is to identify clear objectives (rather than a detailed plan of action) that the group wishes to pursue to develop improved fusion solutions or parameter access. Comments on synergies with other topical areas are welcome and may lead to proposals for thrusts or task forces.

Two outcomes of the SPW should be (1) each topical area within the Research Group sets their initial research goals for 2024-2025, which will be published on a website to motivate ideas for ROF proposals, and (2) the most compelling ideas for high priority research tasks are identified and people assigned to work out proposals for the Research Council meeting.

Research Council:

Polished proposals for high priority research efforts over the next ~2 years that have been selected via the SPW are presented and evaluated at the Research Council (RC) meeting. These proposals should be for multi-day or multi-week campaigns, not individual experiments. Research Council membership will be set by the new DIII-D User Board. Key people from the DIII-D management team and run coordinator team should be on hand to give advice on wider contexts and capabilities. To be consistent with the anonymized



proposal review process discussed below, names and institutions should not be mentioned in the RC presentations, which will be aided by having the Research Group Leaders give presentations on behalf of their group. Following the presentations, the RC members will provide their assessment of the proposals to the DIII-D Director using a scoring system (impact, clear progress, urgency, foundational science, achieve deliverables) as well as their comments. The DIII-D Director will then meet with the RC members to discuss the results of the scoring and debate the prioritization of the proposals.

Run Time Guidance:

Following the RC meeting, the DIII-D Director will issue a Run Time Guidance (RTG) memo to announce the high priority research efforts for the next ~2 years, which can be organized as thrusts, task forces, or occasionally new topical areas. The RTG memo may also emphasize the most important research goals that the Research Groups should pursue. There should be sufficient detail in the RTG memo that the ROF categories (i.e., ROF “boxes”) can be determined as these are needed to organize the ROF breakout sessions later. The estimated amount of run time for each group should be included in the RTG memo.

After the RTG memo is issued, an expedited Expression of Interest (EOI) process will be used to choose the leaders for the thrusts, task forces and (if applicable) newly created topical areas. The thrusts, task forces and topical areas will have the opportunity to revise their 2024-2025 research goals to account for the updated guidance.

Submission of ROF proposals:

Detailed ROF proposals will be submitted using a “proposal engine” on SharePoint that will steer the proposals through the ROF process. While ROF proposals can be submitted to the proposal engine at any time (i.e., once opened it will not close), a submission deadline will be announced for proposals to be considered in the upcoming run time allocation. Proposals submitted after the deadline will not be considered for run time until the following allocation. Note that in the future run time allocations will be more frequent (at least annually) but for fewer weeks (between 8 and 20) to make it easier for new DIII-D team members and new ideas to be incorporated. Thus, while the RTG memo will typically cover two years, run days will be allocated in two or three batches (which also reduces the work load on the ROF breakout sessions compared to planning for 40 weeks at once).

An important change to the ROF process is that more detailed proposals will be required than in the past. While this is necessary for the anonymized review process discussed next, requiring more detailed experimental proposals up front will make it easier and quicker to turn successful ROF proposals into mini-proposals later. The latter will be facilitated by using a ROF proposal format akin to the mini-proposal structure, i.e.,

1. Purpose of Experiment
2. Background
3. Experimental Approach



4. Resources
5. Experimental Plan
6. Analysis Plan

A ROF proposal template will be available for downloading on the proposal engine SharePoint page. The “Purpose” section should include a discussion of the group goal being addressed (or else state a new goal for the group) and a clear statement of how the results will impact the fusion energy path. “Background” material should put the new proposal into context, and the “Experimental Approach” section should explain the rationale for key choices in the approach and an overview description of the techniques used. The “Experimental Plan” should just convey the main scans to be done and how much experimental time (or shots) are needed, while the “Analysis Plan” should include an assessment of the skills the proposal team will bring to the experiment. While people are encouraged to form proposal teams to improve the proposal quality and reduce duplicate proposals, the ROF proposals are meant to be concise (3-5 pages, 3 pages being appropriate for a half-day experiment) and are not expected to be worked out to the same level of detail as an approved mini-proposal.

Because the first stage of the ROF review process is anonymized, the submitted file containing the ROF proposal shall not contain names or information identifying the proposing team. The proposal engine will process the files to remove any metadata that can identify the author. While author and co-author information will be collected at the time of submission, it will not be divulged until after the anonymized review.

In addition, when submitting the ROF proposal the proposal engine will prompt the submitter to answer the “40 questions” (most of them, anyway) that the DIII-D Run Coordinator Team (RCT) have been asking mini-proposal leaders to answer in the past. The information from the “40 answers” will become part of the ROF evaluation process. If the submitter is unable to answer a question at the time of submission, they can select “not determined” and answer that question later.

Anonymized Review of ROF Proposals:

All submitted proposals will undergo an dual-anonymous review, meaning that the submitters and reviewers will not be known to each other, to evaluate its scientific and technical quality. When first submitting a ROF proposal, the author will pick a topical category from the same list of “DIII-D Science” categories found on the Publications Tracker.¹ After the RTG memo is issued and the ROF categories are determined, a second list of sorting categories will be added to the proposal engine to allow authors to link their proposal to the appropriate ROF breakout session. If the author doesn’t select a second

¹ Transport, Rotation Physics, L-H Physics, Energetic Particle, Heating & Current Drive, General Science, Negative Triangularity, Inductive Scenarios, Steady State Scenarios, 3D & Stability, Control, Disruption Mitigation, Pedestal/SOL, RMP-ELM, Pellet Physics, QH & ELM Free Physics, ELM Physics, Divertor Science and Innovation, Materials, Core-Edge Integration, ECH, Neutral Beams, Tokamak Ops, Elec. Systems, Mech. Systems, RF Systems, General & Misc., Diagnostics.



sorting category then the DIII-D Research Director will select one for them ahead of the ROF breakout sessions.

Three reviewers will be randomly assigned to each proposal. The reviewers will be members of the DIII-D Team, not including students and postdocs, who “opt in” to the anonymized review process. To avoid conflicts of interest, the eligible pool of reviewers will not include the proposal’s author or co-authors, or scientists who expect to submit proposals in the same topical category (reviewers can also opt out of topical categories they don’t feel competent to review). The reviewers will evaluate the submitted proposals and assign scores for

1. **Scientific Merit:** Prospects for fundamental advance, new approach, understanding, or valuable results? Uniqueness, originality, and scientific merit compared with other efforts? Impact on the field?
2. **Technical Approach and Feasibility:** How well developed is the idea? Is it logical and/or feasible and/or innovative? Is it well thought out? What is the likelihood of a valid conclusion or success? Have potential problems been recognized and alternative strategies considered?
3. **Analysis Plan:** Are the identified analysis tools and techniques sufficient to meet the scientific objectives? Are there needs for additional tools or techniques in areas not described in the proposal? Are there conclusions that will be hard to resolve within the stated capabilities detailed? If so, how well can this be mitigated?
4. **Fusion Energy Impact:** How will this proposal advance on fusion energy goal for ITER, a fusion power or pilot plant or other critical fusion energy concepts? How vital is this study to that goal? How distinctive are the DIII-D contributions – what unique value is added that cannot be obtained elsewhere?

Pinboard:

Following the anonymized review, ROF proposals will be posted to a pinboard viewable by the DIII-D Team. At this point the proposal will be uncloaked, with all its data and authors made public, together with reviewer scores and comments, but not reviewer names. DIII-D Team members will be able to post comments about proposals using the SharePoint comment feature; comments should be constructive and help the authors improve their proposals, for example, by better aligning with the goals of the chosen ROF category. The pinboard will only display the “as reviewed” version of the proposal.

New experimental ideas will sometimes require plasma development work to be done beforehand, usually through a “control session.” The run time for these control sessions should be included in the total run time requested for the experiment; however, the proposal author may not realize that a control session is needed for their experiment. To help with this situation, members of the Physics Operations organization will examine the ROF proposals posted to the pinboard and can add comments pointing out if a control session will be needed.



ROF Breakout Sessions:

Breakout sessions by ROF category are a key part of this experimental planning process, the aim being to discuss subjectively and logically which experimental proposals most effectively address the RTG and group goals. Breakout groups should work towards a consensus decision on a prioritized list of experiments, or at least achieving group buy-in on the prioritization, which may involve combining similar proposals or modifying proposals to better address important topics. While groups can take into account long term (~2 years) plans when setting prioritizations, only the prioritized list of experiments for the upcoming allocation is needed at this time.

Other issues that can be discussed in the breakout sessions are (1) assessment of the proposal team's readiness, workforce development plan and inclusivity, including the suitability of skills and selection of the mini-proposal leader(s), and (2) the incorporation of "piggyback" experiments into main experiments. Note that a person should not lead more than one experiment per year per ROF category to facilitate greater participation and new ideas.

If a group has an approved experiment that went unscheduled during the previous experimental campaign, then the group may elect to carry over this experiment on their prioritized list for the next run time allocation. In cases where a thrust or task force has completed its term, the DIII-D Research Director will work with the group leaders to find a new home for these previously approved experiments.

Since the submitted proposals will be more substantive than in the past, and the anonymized review process will have already evaluated the scientific and technical merits of the submitted proposals, authors should not present their proposals at the ROF breakout sessions. This should shorten the amount of time needed for breakout sessions compared to previous years. Participants should familiarize themselves with the purpose/goal of each proposal and the anonymous review scores and comments ahead of the meeting (the breakout session leaders can send out a compilation of this information to the group).

While substantial weighting should be applied to the quality metrics from the anonymized review, it may well be the case that the breakout group gives high priority to some middle scoring proposals in order to meet RTG and group goals. Breakout session leaders need to present well thought out arguments to their Research Group Leader and/or DIII-D Research Director to justify such deviations from the review scores to preserve the integrity of the anonymized review process. It is generally expected that proposals that have high review scores and are well aligned with the RTG and group goals will be given high priority.

Run Time Allocation:

The leadership of the DIII-D Research Division serves as the formal tensioners in the experimental planning process. Research Group Leaders will review the prioritized lists of all ROF categories under them and may make adjustments, in discussion with the breakout



group leaders, to the selection balance or number. The final prioritized experimental list from each Research Group (including thrusts) and task forces should be discussed amongst the leadership of DIII-D Research Division, under the guidance and chaired by its Director, and adjusted to form an overall balance that most effectively meets the RTG goals. This will be submitted to the DIII-D Director, who will then issue a Run Time Allocation (RTA) memo covering the next 8-20 weeks to confirm the number of run days for each area. Several run time allocations may be made between Research Council meetings, keeping the same set of ROF categories. The DIII-D User Board will be consulted regarding the run time allocation prior to release.

Following the issuance of the RTA memo, the DIII-D Director or DIII-D Research Director will give a presentation to the DIII-D Team explaining how the allocation decisions were reached. Decisions about the ROF proposals will be entered back into the proposal engine by the Research Group Leaders or DIII-D Research Director to ensure the tracking of all proposals, identifying if they were selected, merged, deferred to later selection, rejected, or simply not assessed. Rejected proposals will be removed from the active proposal list and archived. Selected/merged proposals should be removed from the list for future ROF selections, and archived for reference by the team.

Ph.D. Students:

Following the highly successful model of 2022-23, the RTG memo will include a separate run time allocation for Ph.D. students. Detailed proposals from Ph.D. students need to be submitted to the proposal engine and undergo anonymized review as described above (authors should flag themselves as Ph.D. students when submitting their proposal). The DIII-D Education Committee will be charged with making recommendations to the DIII-D Director for allocating run time for these student proposals from the separate RTG student category based on the anonymized reviews, dissertation need and urgency. Students should not expect to receive more than one such run time allocation during the course of their dissertation. Note that ROF breakout groups can also include Ph.D. student proposals on their prioritized list of experiments if merited by the review scores and alignment with the RTG and group goals. To avoid duplicate allocations of run time, the DIII-D Education Committee should strive to make their student run time recommendations before the start of the ROF breakout sessions so that the breakout groups can factor this into their prioritizations. (If a student proposal does receive duplicate allocations of run time, then in most cases the ROF category will be given extra time back to execute additional proposals on their list.)

Director's Reserve:

The DIII-D Director may also hold back run time to allocate later as Director's Reserve (DR). While the present DIII-D Director welcomes initiatives to explain compelling new ideas either in person or at the DIII-D SET meeting, he adopts a requirement that all such ideas must also be (i) discussed amongst a pertinent Research Groups or task forces within the DIII-D Research Division, and (ii) be subject to a recommendation from the DIII-D



Research Director. DR time may also be used to simply complete existing run selections in cases where program time is challenged.