



## Call for proposals for the use of the EUROfusion High Performance Computer (Marconi-Fusion)

**Deadline for answers (2<sup>nd</sup> cycle): Friday 12<sup>th</sup> May 2017**

*Call for proposals for projects using the EUROfusion High Performance Computer (Marconi-Fusion); applications should be sent to [duarte.borba@euro-fusion.org](mailto:duarte.borba@euro-fusion.org), by **Friday 12<sup>th</sup> May 2017** using the appropriate template “template\_for\_applications\_(2nd Call).doc” for additional resources available in the A2 and A3 partitions from August 2017 until December 2018*

### **1. Preface**

The EUROfusion High Performance Computer (Marconi-Fusion) installed in Bologna, Italy and hosted by CINECA/ENEA started operation on 1<sup>st</sup> July 2016. The Computer contains three partitions (A1, A2 and A3), two composed of conventional nodes (A1 and A3) and one of advanced nodes (A2).

### **2. Scope of simulations in the EUROfusion High Performance Computer Marconi-Fusion**

In order to make efficient use of this new facility, with this call for proposals, we would like to invite scientists and engineers to propose project(s) to be run on the EUROfusion High Performance Computer (Marconi-Fusion). Projects shall be relevant to fusion development (ITER & DEMO) in the field of magnetic confinement and primarily deal with numerical simulations in the following areas:

- Plasma turbulence and related transport processes
- Fast particle physics
- Linear, nonlinear and/or extended MHD
- Edge physics
- Heating and current drive
- Integrated modelling of fusion plasmas
- Reactor materials
- Reactor technology

in order to analyse experimental data on fusion plasmas, to prepare scenarios for ITER operation, to predict the performance of ITER, and to contribute to the DEMO design physics basis.



### 3. Specification of EUROfusion High Performance Computer Marconi-Fusion

The characteristics of the EUROfusion High Performance Computer Marconi-Fusion are as follows. In the first phase of operation the computer contains three partitions A1, A2 and A3.

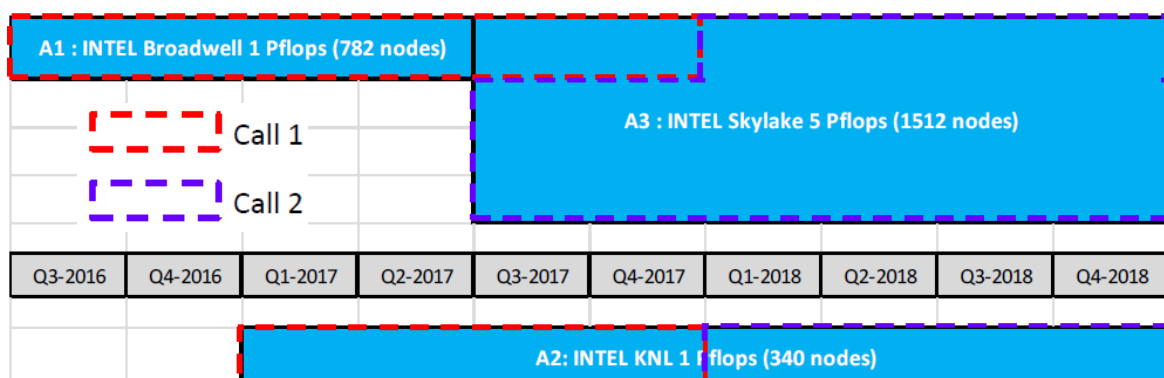
The **A1 partition** includes 782 **conventional nodes** based on two Intel E5-2697 v4 Broadwell, 18 cores @ 2.3GHz sockets with a total of  $2 \times 18 = 36$  cores per node. This partition peak performance is around 1 PFlops. Please note that 1 node hour in Marconi-Fusion is approximately equivalent to 3 node hours in Helios for the conventional nodes of the A1 partition. The memory per node is 128 GB. The A1 partition is available since in July 2016 (Q3-2016).

The **A2 partition** is composed of 328 Intel Xeon Phi Knight Landing (KNL) **non-conventional nodes** at 1.7 GHz with memory per node of 96 GB + 16 GB of MCDRAM. This partition peak performance is around 1 PFlops. The A2 partition is available from January 2017 (Q1-2017). Please note that 1 node hour in Marconi-Fusion is approximately equivalent to 3 node hours in Helios for the non-conventional nodes of the A2 partition.

The **A3 partition** is based on the new generation INTEL Skylake Technology and it will be available in August 2017 (Q3-2017) and it will have a peak performance around 5 PFlops. The memory per node will be 196 GB. Please note that 1 node hour in Marconi-Fusion is approximately equivalent to 5 node hours in Helios for the nodes of the A3 partition.

A3 partition will replace the A1 partition approximately in August 2017 (Q3-2017).

**The resources allocated in this call will use resources available in the A2 partition from (~1 PFlops) 1<sup>st</sup> January 2018 until December 2018 and additional resources available (~4 PFlops) in the A3 partition from August 2017 until December 2018.**





#### **4. Eligibility for proponents and participants in projects**

The Principal Investigator of each project must have a contractual link with an organisation member of EUROfusion and be empowered in this organisation to propose this kind of project. In the case of scientists not belonging to such organisations, they can participate in the project only as collaborators and their participation in the project must be covered by a formal agreement.

#### **5. Proposal and selection**

Applications that are particularly suited for use on the EUROfusion High Performance Computer (Marconi-Fusion) are large, highly scalable parallel applications requiring exceptional computational resources: the minimum requirement suggested are 0.03M node hours per year in parallelized applications, where one node corresponds to 2x24 cores for the **conventional node A3 partition**.

As an indication from previous allocations to High Performance Computers hosted or organised under EUROfusion, the average / maximum yearly allocation granted to single projects is expected to be about 0.1 / 0.5 M node-hours, respectively. Please note that 1 node hour in Marconi-Fusion A3 partition is approximately equivalent to 5 node hours in Helios.

The proposal should *detail the scientific objectives* of the project, the numerical tools used and the required resources following the attached “template\_for\_applications (2nd Call).doc”.

In the proposal, the project leader must describe in detail the justification for the use of the resources requested, by including the information in terms of expected number of runs, number of nodes used, and elapsed time per run and the relationship to the scientific objectives. **Without proper justification of the use of resources the project will be rejected.**

Proposals will be selected according to a peer review process defined by the Allocation Committee; only proposals, which are technically fit for the EUROfusion High Performance Computer (Marconi-Fusion), requiring exceptional computational resources will be kept while the final selection will be made according to the scientific and technical merit of the proposals taking into account the following criteria:

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|---|-----------------------------|
| (1) Quality / scientific excellence of the proposal   | (Weight: 40% no threshold)  |
| (2) Impact to the fusion research   | (Weight: 30% no threshold)  |
| (3) Quality, skills, recognised expertise and competences of the team to carry out the proposal, including the outcome of the projects in previous cycles (this will apply to calls for cycle 2 and followings) | (Weight: 20% no threshold)  |
| (4) Resource management/efficient use of the resources  | (Weight: 10% threshold > 2) |

Proposals with one or more evaluations below the threshold of 2 (the range of evaluated values is from 0 to 5) in category (4) will fail. For projects, which are the continuation of a previous cycle of allocation, the peer reviewers will take into account the



outcome of that project in making their evaluation. This will be done by making the reports (see section 8) and evaluation reports of related projects to the referees, which will take these into account in the evaluation process, together with the Project proposal.

## **6. Presentation and publication of obtained results**

The participants must agree to acknowledge EUROfusion and the EUROfusion High Performance Computer (Marconi-Fusion) when the results of the projects are presented and published. In the presentations, the EUROfusion logo must be included when the simulation results are shown.

## **7. Contact points**

The proposals should arrive at ([duarte.borba@euro-fusion.org](mailto:duarte.borba@euro-fusion.org)), by **Friday 12<sup>th</sup> May 2017**. Successful projects will be implemented on the EUROfusion computer Marconi-Fusion (2<sup>nd</sup> Cycle) starting from 1<sup>st</sup> August 2017 and ending on 31<sup>st</sup> December 2018. Questions on the call for proposals should be sent to Duarte Borba, the chairperson of the Allocation Committee ([duarte.borba@euro-fusion.org](mailto:duarte.borba@euro-fusion.org)).

## **8. Reporting**

After completion of the project a short written report (i.e. 1-2 pages) presenting the main results is required and shall be sent to ([duarte.borba@euro-fusion.org](mailto:duarte.borba@euro-fusion.org)). The reports will be evaluated by the EUROfusion High Performance Computer (Marconi-Fusion) Allocation Committee. If applicable, this report will be taken into account when assessing a continuation of the project.