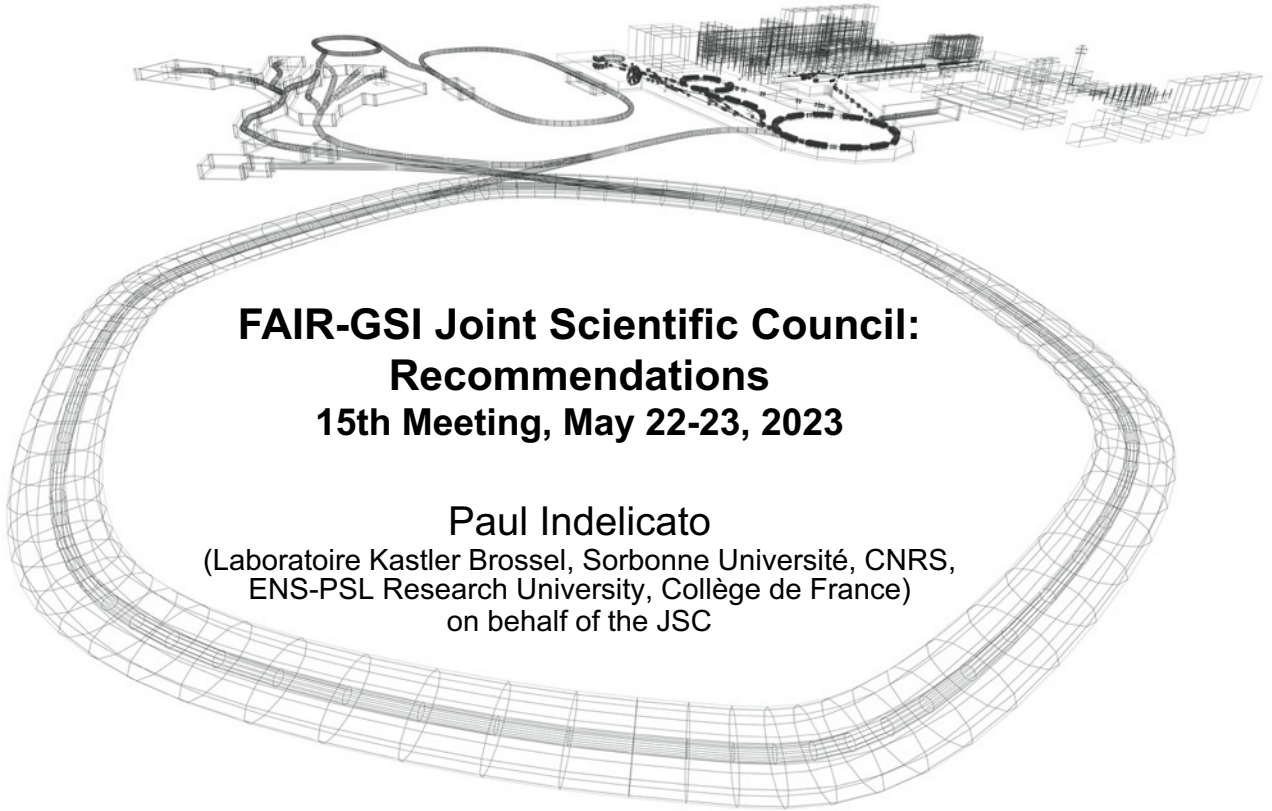

FAIR-GSI Joint Scientific Council: Recommendations

15th Meeting, May 22-23, 2023

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on behalf of the JSC

15th JSC Meeting - Resolutions

1) The JSC **highly commends the initiative by the German shareholder to provide very substantial additional funding** in times of challenging circumstances. This is very much appreciated as an essential step towards realizing world-class science at FAIR. The JSC **very much appreciates the willingness and ongoing efforts of the other shareholders to seek ways to also commit additional funding** in a timely manner.

15th JSC Meeting - Resolutions

2) The JSC understands that the Collaborations are currently working on detailed plans for the optimal use of the approved facilities. The JSC **strongly encourages the Collaborations to continue their plans to maximize the scientific gain and output**. This is an ongoing process in which the planning will become successively more concrete and detailed in the near future. The **JSC intends to closely monitor** the corresponding **progress of planning and of the realization** of the facilities and experiments **until the start of Early Science and First Science**.

15th JSC Meeting - Resolutions

3) The JSC had previously made the following recommendation in view of the "First Science and staging report" in 2022: "If a potential decision were to be taken between the scenarios of having SIS-100 beams into S-FRS and HEB cave with or without CBM in parallel ("First Science plus" vs. "First Science"), having CBM in addition ("First Science plus", FS+) should be strongly preferred. The CBM detector development is already very advanced. The difference in cost is therefore significantly below the current uncertainty of overall costs (as stated in the report), whereas the enormous scientific gain of CBM would outweigh the limited monetary saving relative to the investments already made." **The JSC stands by this assessment**.

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Realizing **“First Science plus”** (i.e., including CBM) **would** not only serve a significantly wider community but **constitute a major increase in scientific scope and diversity and an enormous scientific gain**. The JSC therefore welcomes that the recent decision leaves room for realizing “First Science plus” (or even more) if sufficient funding commitments are made by the partners.

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4) The current **uncertainty concerning the availability of funding for "First Science plus"** results in a **difficult situation for CBM and for parts of** the **PANDA and** the **APPA** (in particular BIOMAT), all of which intend to perform experiments in the CBM cave. In the short term, **funding applications** by the involved university groups necessary for completing the already very advanced construction of the experiments **are impeded**. In the APPA pillar, **substantial external funding** from ESA and other agencies would be **lost**.

In the mid- and long term, a delay of several years would be **particularly detrimental for the CBM pillar**. Due to the high specialization of their cutting-edge research, **researchers from the CBM community would not be able to benefit from other FAIR experiments**, thus putting on hold almost all of their activities at FAIR for an extended period.

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15th JSC Meeting - Resolutions

This would inevitably lead to a **loss of CBM research groups** who would take up activities elsewhere, resulting in a **serious drain of expertise and a serious deterioration of perspectives for young scientists** in this field. Even the complete loss of this scientific pillar of FAIR is likely in the case of a longer delay. In view of this, a **timeline for the realization of CBM is urgently needed**, together with funding decisions for time-critical components within the next year.

The corresponding funding commitments are needed immediately, if necessary combined with a completion schedule optimized for scientific output.

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5) The **JSC urges the non-German shareholders to commit the necessary additional funding to secure “First Science” and to make “First Science plus” a reality**. These funding **decisions need to be taken very soon in order to preserve “First Science plus” as a viable option** from which outstanding scientific results are expected.

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6) The JSC **reiterates** the following recommendation, presented to the FAIR Council in October 2022 in view of the "First Science and staging review": “The JSC emphasizes the need to define, in the near future, a timeline for the additional steps towards the IO and the MSV, and thus towards exploiting the full potential of FAIR in a time frame that will enable FAIR to remain at the forefront of world-wide research. A timeline is crucial for giving a perspective in particular to young scientists. They are the future of research in all areas of FAIR.”

7) The JSC strongly recommends to implement measures for risk mitigation concerning the production of **SIS100 quadrupoles**. The **procurement from alternative suppliers** and in particular prototyping **should be addressed immediately**, as also recommended by the MAC.

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8) The present challenging **financial situation of GSI** makes mid- and long-term planning difficult, seriously **affecting planning of all scientific activities** of GSI, and consequently for FAIR. The JSC would like to encourage the funding bodies to address this situation, and in particular **conclude on the modus operandi of GSI finances in relation to FAIR**.

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9) The JSC recognizes the ideas being developed by the Collaborations to use detector components to augment experiments in First Science and at other existing facilities. At FAIR in particular, the JSC **encourages** the Management and all Collaborations to, **within the approved FS (or FS+) facilities and thus available beams**, seek **to optimize the science output by using experimental equipment originally foreseen for use elsewhere in the MSV**. However, the JSC would encourage ideas for further **new experimental setups** at FAIR **only if** they would enable **new and unique science opportunities**.

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10) The JSC **thanks** the **ECE**, **MAC**, and **BFC** for their **informative presentations**.

11) The JSC commends **excellent new results** in **GSI research** and in **Phase-0 experiments**.

12) The JSC is **very impressed** by the **outstanding world-leading research** performed **at** the **Helmholtz Institute Mainz**, as presented especially by young scientists. The strong activities in hadron physics and superheavy elements are of great relevance for the research scope of GSI and FAIR

13) The JSC is **extremely impressed** by the **progress** made with the **HELIAC** accelerator. It could play an important role in view of its potential use as injector for FAIR.

Thank you for your attention.