**Carnegie IR 2018 Annual Report**

**COMPRES Facilities Comments**

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*-Science*: This integrated synchrotron IR facility provides tools for the COMPRES community that allows conducting promising cutting-edge studies in Earth and planetary science. However, one can regret that the 2 research highlights are not related to geosciences (behavior of KBr at high P and metastability in 2D hybrid perovskites). Also, most studies are published in non-geoscience journals (pub list). Hopefully this does not mean a lack of interest for geoscience studies…! This was already a concern raised last year by the Facilities committee.

The pub list should only be for the past 12 months (not 2017+2018 reviews) to reflect better the productivity over the review period. It seems that pubs from 2017 are from the previous review period.

I count only 5 pubs published in 2018: how many are from COMPRES users? I am not sure the papers that are submitted (=not accepted yet) should be listed, and here they represent a significant part of the pub list (7 pubs). They should only be listed in next year’s report, when they are finally accepted/published.

*-User community:* Scientists from 12 universities have used this facility.

More information (statistics) is needed regarding the time allocated to COMPRES users, the training/involvement of students and postdocs (as seen in the reports from the other facilities and specified in the guidelines for the report). For instance, the “Beamline operation” section is very succinct and does not answer the questions listed in the guidelines. This, too, was already mentioned in last year’s committee evaluation.

The workshop organized in May at NSLS-II represents a valuable effort and seems to have been successful and stimulating for the community.

*-Management team:* Beamline scientist (Zhenxian Liu) is a research Professor at GWU.

Funds are requested to partly support a junior beamline scientist. The justification for this position is a bit thin and would benefit from a more detailed argumentation (only one sentence p. 5). It is written that “A candidate search and hiring process will begin as soon as the funds are committed”: a more precise timeline about the hiring process would be welcome.

Justification for this second beamtime scientist position was also a recommendation formulated by the last year’s Committee.

*-Facility:* The status of this beamline is confusing (at least to me): the mix of present tense and future tense in the overview section does not help understand what is currently operational and what is part of future developments/plans. There is clearly a lot of great science and a strong potential for future great science to be done at this facility.

Several future upgrades/developments are proposed, but unfortunately, the description is not made accessible to people who are not experts at DAC+IR techniques (a better balance between a general description of proposed upgrades and technical details should be adopted for future reports – this applies to all facilities).

From p. 1, it seems that a major development for early 2019 is “the integrated optical facility for far-IR to UV absorption and reflectance spectroscopy with synchrotron and conventional sources, together with laser Raman and photoluminescence spectroscopy”. However, I do not see any further reference to it in the report (?).

**Mark Rivers**

This beamline has made good progress in getting ready for user operations in early 2019. This will come after a nearly 5-year dark period for IR at Brookhaven. The delay has not been due to the COMPRES project, but entirely to the priority of the IR ports with NSLS-II management.

The COMPRES supported workshop was well attended, and appears to have been very successful. The COMPRES earth science community has been kept engaged with the facility through the offline IR systems that have been available as a user facility.

While the FIS will only run 50% of the time, compared to 100% at U2-A, the quality of the beam should be significantly better, and the experimental capabilities are more advanced.

Last year the committee recommended:

The Committee does not recommend funding the second beamline scientist at this time, given the significant lack of justification in the report. We encourage the PIs to build a stronger case for a new hire as part of a future report or as response to the comments from COMPRES.

Carl’s letter to the PIs said:

I will need an official budget from you on NSF budget forms for the following amount: **$285,000**, which provides, among other things, continuing support for **1.0 FTE** (Zhenxian Liu) at FIS NSLS-II**.** This amount, approved by the Executive Committee, is an increase of more than 20% over last year’s budget (+$48,000). This increase combined with the $85,000/year contribution from the new CDAC grant (was $100,000/year, but reduced by 15%, per PI Hemley) should be allocated to the salary of **1.0 FTE** “Junior Beamline Scientist” [new position] at the FIS NSLS-II, as well materials and supplies for the FIS facility.

So they were supposed to take 48K from COMPRES and some or all of the $85K from GWU and hire a Junior staff. They have not done that yet. But now they are saying

We requested an increase in the FIS operation funds to support a junior beamline scientist last year but only received half of the requested funds. We request that the FIS operation funds for Year 3 will continue to support the junior beamline scientist for six months so that we can begin the hiring process. This is critical to utilize the FIS facility more efficiently and productively, as well as to continue to explore and support the DAC programs at other x-ray beamlines at NSLS-II. A candidate search and hiring process will begin as soon as the funds are committed.

So they are saying COMPRES only funded half the position, and now want the other half. But GWU was supposed to fund the other 50%.

This year they did not provide much additional justification except that the new person would also work on accessing x-ray beamlines for DAC work. This is a potentially interesting way to keep COMPRES involved with DAC at NSLS-II without investment in a dedicated hutch or a full-time staff.

There are 5 publications to date in 2018. This is rather low, since the offline facility has been running most of the year.

At least two of the papers in the publications are listed as “submitted”, which is the same status as the same paper in the 2017 report. It seems like the editors should have made a decision by now!

2017: Hong, F, B. Yue, X. Wang, Z. Cheng, Z. Wang, M. Kunz, Z. Liu, B. Chen, and H.K. Mao,Pressure and Structure Driven Topological Insulator-Metal Transition in 2D Bi2Se3 Nanoflakes, *Nature Materials*, submitted.

2018: Hong, F, B. Yue, X. Wang, Z. Cheng, Z. Wang, M. Kunz, Z. Liu, B. Chen, and H.K. Mao,Pressure and Structure Driven Topological Insulator-Metal Transition in 2D Bi2Se3 Nanoflakes, *Nature Materials*, submitted.

2017: Zhang H., Q. Li, B. Cheng, Z. Guan, R. Liu, B. Liu, Z. Liu, X. Li, T. Cui, and B. Liu, Structural Transitions and Metallization of Monoclinic Vanadium Dioxide under High Pressure, *J. Phys. Chem. C*., submitted.

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**Chris Seagle**