

WG1 meeting 02-09-2020

Participants

Present

Laurent Gelman, Stan Schwartz, Alex Laude, Nathalie Gaudreault, Roland Nitschke, Ulrike Boehm, Sebastian Munck, Andrea Bassi, Frank Eismann, Britta Schroth-Diez, Marcel Kirchner, Ute Resch-Genger, Claudia Jaffee

Excused

Manual Deutsh, Konstantin Birngruber, Orestis Faklaris, Mišo Mitkovski, Werner Zuschratter

Meeting Notes

From the agenda:

1. Welcome new participants (two new participants from industry)¹
2. Agreement on minutes of last meeting (all agree)
3. Agreement about recording the meeting (yes)
4. Duration of each meeting and frequency
 - Time: 5pm (Paris) = 8am (US PST) (yes, first Wednesday of the month)
 - Recurrence: Every first Wednesday of the month? (everyone agreed)
 - Duration: 1h30 (agreed)
5. What should be the outcome (product) of this working group?

The protocol we write could be based on document ISO 21073. We will improve it and add to it. Goal is to produce a document (chapter) describing how to make the measurements to determine the stability of Illumination Power.

6. Timeline for this outcome (delivery)

If we based our chapter on ISO 21073 we could be done in 2 months.

7. Define how we want to work, constitution of sub-groups, shared documents, etc.

Looks like we will edit the document live while discussing during meeting.

Link to the document:

https://bwsyncandshare.kit.edu/apps/onlyoffice/394015561?filePath=%2FQA%20and%20Reproducibility%20for%20Instruments%20and%20Images%20in%20LiMi%2FWG%201%20Illumination%20power%2FISO_manual_V2.docx

Discussion about the ISO Manual V2:

1. Usage of an objective for the measurement, centering and focusing:

Discuss that to measure stability of laser we may not need to use a 10X objective.

¹ All WG1 registered participants:

<https://bwsyncandshare.kit.edu/apps/onlyoffice/293198449?filePath=%2FQA%20and%20Reproducibility%20for%20Instruments%20and%20Images%20in%20LiMi%2FWG%201%20Illumination%20power%2FParticipant%20List.xlsx>

Should we use the focal plane for the position of the sensor area. Proposition: focus on a slide then position the power meter. This will allow you to be in an ideal area – not exact focal plane. Important to be in the working distance of the objective. Suggested to defocus slightly.

Alternatively, the power meter could be positioned where the laser beam collimates (back aperture) from Ulrike (for non-commercial system)

Should we remove the objective or not: may not be available to all.

Using a standard 10x is more applicable and reproducible for most.

Unscrewing the objective may be difficult to position the power meter.

Roland would not recommend using the focal plane.

Power meter should be fixed and stable not hand held.

For reproducibility of power perhaps determining a position in Z is preferable but not for the measurement of stability.

Position sensor area centered over the beam. You can use the cross on the other side of the slide holding your sensor.

Slightly defocus the position in Z of the sensor.

We want to recommend using a 10x objective

The sensor area should exceed the area of the beam to be measured.

2. Illumination/optical settings

Dichroic mirror?

The beam should be stationary, we should have all vendor agree to provide this function (park). It is much harder when using a scanning beam.

We should determine what should be the area of scan and speed of scan, dwell time.

Compatible filter cube to the respective wavelength to be measured.

We should make sure we cover the method for non-commercial system as well.

For comparison you need to always use the same optical setting. We should describe what we mean by optical setting.

10-100% may not be the most precise value on which to measure stability. These two measurements should be stated in mW and not percentage. But we also want to know the stability of your system at 100% and perhaps at lower percent of your system.

Should stability be based on specs from manufacturer or based on your imaging needs?

May work for solid state laser but not for gas laser?

We could use a value and recommend measurement at x% above and below.

Percentage of measurement was highly recommended by Claudia- disagreed with a specific power in mW due to the variety of laser power range.

We should mention for which type of system this applies if it doesn't apply to all.

3. Not to be discussed now:

Scope of the protocol: Intensity measurement, sampling in time and Metrics for stability

Power-meters

Troubleshooting low intensity and instability

Extension to wide-field microscopy

Review previous and new action items

Action items from previous meeting

- ◊◊ Next meeting date: 1st Wednesday of the month
- ◊◊ Ulrike to contact all power meter companies

New action items

- ◊◊ Nathalie and Laurent will send the minutes to the participants.
- ◊◊ Laurent will send a recurrent invitation for a meeting on every 1st Wednesday of the month.
- ◊◊ Laurent will upload the recorded meeting on the website.²

Follow-up communication:

Info e-mail by Stan Schwarz

From: Stanley Schwartz <stanley.schwartz@outlook.com>

Sent: Thursday, September 10, 2020 07:53

To: Gelman, Laurent <Laurent.Gelman@fmi.ch>

Cc: steven.bagley-2@manchester.ac.uk; boehmu@janelia.hhmi.org; orestis.faklaris@mri.cnrs.fr;

nathalieg@alleninstitute.org; david.grunwald@umassmed.edu; alex.laude@ncl.ac.uk;

mitkovski@em.mpg.de; baptiste.monterroso@unice.fr; sebastian.munck@kuleuven.vib.be;

ute.resch@bam.de; schroth@mpi-cbg.de; Werner.Zuschratter@lin-magdeburg.de; Konstantin Birngruber

<Konstantin.Birngruber@toptica.com>; Claudia Jaffe <claudia.jaffe@lumencor.com>;

Roland.Nitschke@biologie.uni-freiburg.de

Subject: Re: QUAREP-LiMi WG1 Follow up for our discussion yesterday concerning the power measurement

Dear WG-1,

At the last meeting there was a discussion about beam parking and if it is possible from the normal control software, also this led to discussion if QC software used by service/install people would be available for use by users. I asked these questions to members of the application support team at Nikon USA; see below for response.

- 1) Can Nikon point scan confocals park the beam for QC/QA purposes? Is it in the standard control software, part of scan area setup or elsewhere? Or is it only in the confocal set up / initialize service / install software?
- 2) Is there a Nikon confocal instrument QC set up and check procedure published? Available to customers or only available through service team? Is a QC check report still provided on scan head and laser boxes when shipped to the customer?

² Folder location for this meeting:

<https://bwsyncandshare.kit.edu/apps/files/?dir=/QA%20and%20Reproducibility%20for%20Instruments%20and%20Images%20in%20LiMi/WG%201%20Illumination%20power/Zoom%20Meeting%2002.09.2020&fileid=394185205>

Edited response:

In regards to parking the beam some discussion has taken place in the past that galvos that are “parked” may experience so called “jitter” when they are under power to hold them in place. While it is true that Galvo mirrors are analog devices, their precision is arguably often times below the detectable resolution limit of the microscope they are being used with. It is not likely this “jitter” is a significant contributor on a 3mm (or smaller) mirror traversing something like 30- 45° at 12 bit (or more) precision. After all, if jitter was a real issue, it would be awfully hard to do FCS with any commercial point scanning confocal! The Galvo manufacturers can answer that best, like Cambridge Instruments for example (one of the largest Galvo suppliers for confocal instruments). To answer the specific question, Nikon emulates beam parking by setting the zoom to 1000x, which essentially parks the mirror on axis. This can be done in the user-accessible software (NIS-Elements). Likewise, such a procedure can be done in the service-level software and is actually part of the procedure of how the scan head is aligned to the microscope.

In regards to service level software and QC setup / checkout availability; I imagine no manufacturer publishes their QC / QA checklists procedures as performed in the service centers. That would be proprietary and confidential information that competitors would not share. Nikon Corp has such documents for assembly and alignment of scan heads before they are shipped to worldwide areas. Once received, WW areas assemble these systems with other ancillary components and do system-level QC checks, which also involve a checklist and sample images/data being collected....but none of that is public information. Of course all units are serialized and QC data is stored at the service facility and is reviewed during service contract / PM visits. Currently, our service department does not provide end users with checklists or sign-off sheets for systems when they are installed.

I hope this is helpful but do consider the business aspects and the competitive legalities regarding the rules of engagement, while keeping this discussion within the WG only.

Stanley Schwartz