Dear Editor,

We thank you and the referees for the helpful comments. We have corrected the manuscript accordingly, and we submit a revised version, with the changes highlighted.

In the list below, we address each comment in blue.

Changes to be made by the Author(s):

1. Please take this opportunity to thoroughly proofread the manuscript to ensure that there are no spelling or grammar issues. The JoVE editor will not copy-edit your manuscript and any errors in the submitted revision may be present in the published version.

We corrected a few typos and changed some words to make sentences more clear (lines 81, 116,267,280).

2. Please decide between open access and standard access. On Editorial Manager, you have selected access but on the Author License Agreement, you have selected open access.

We chose the green route and have been in touch with Alex Bhatty regarding some details.

3. Please provide a scale bar in Figure 2.

We added a scale bar and resubmitted the figure.

4. Formatting:

-Please define all abbreviations at first occurrence (e.g. DC).

We defined the abbreviations (lines 78,115).

-2.3 – It is unclear why Kurt J. Lesker is cited here. If the target was obtained from him, this should be indicated in the materials table. Is anything done to the sample after deposition (like any cleaning)?

We removed Lesker from the protocol (line 128) and added the target to the materials table. The sample is ready for use after the deposition.

5. Grammar:

-1.2 – Please clarify what is meant by “Polish the SQUID chip into a corner located near the pickup loop”. This reads as though the chip is moved into a corner by polishing it.

We rephrased 1.2 to clarify that the material of the chip is removed all the way to the pickup loop (lines 109-113).

-4.6.1 – Should be “to move the sample”.

We rephrased the sentence (line 189).

-Figure 3 legend – “Several manipulation”

We changed "manipulation" to "manipulations" (line 248).

6. Additional detail is required:

-2.2 – Is the substrate placed in the chamber after the pre-sputtering step? What are the settings for pre-sputtering?

We added the pre sputtering settings to the protocol, and added step 2.3 to clarify that the substrate is placed in the chamber after the pre-spattering (lines 119-125).

-3.1 – How is the sample loaded on the microscope?

We added a step to the protocol describing this stage (lines 140-141), and added GE Varnish and silver paste to the materials list. We have also added directions for loading the SQUID chip to the microscope (lines 136-139).

-3.5 – How and how far away is the sample moved from the sensor?

The sample is moved using the Z direction stick-slip motion stage, to a distance of 0.5-1mm from the sensor. We added this information to the protocol (line 154).

-3.6 – Please describe the angles. Are they between the sample and the sensor?

We rephrased the sentence (lines 156-157), and changed figure 1 (panels c and d) to better explain this.

-3.7 – How close to the sensor?

Sample should be 1µm away from the sensor. We added the information to the protocol (line 159).

-3.8 – Please clarify “the first to make contact.” Will anything else be making contact with the sample?  
We rephrased the sentence so that the meaning is clear (line 163).

-4.2 – How is the magnetic field generated? How does one know the number of vortices?

We added an explanation regarding how the magnetic field is applied (lines 171-172). We have also added information to instruction 4.1 and updated the equipment table, in order to further clarify the setup (lines 167-169).

-4.6.2 – How is this monitored? Is there an output to view?

We have changed step 4.6 in order to describe more accurately the approach sequence to the sample (lines 183-201).

-4.7 – How is scanning performed/initiated?

We added a sentence to explain that (lines 203-204), we also added an explanation for achieving a constant height above the sample (lines 205-207).

-4.10 – How greater of a voltage? How is the sensor moved?

We added the information (line 214). We explained the movement of the sensor in 4.7.

7. Branding should be removed from steps 1.1 and 3.4 - attocube

We removed the branding (lines 106, 149).

8. Results: Please discuss the results presented in more detail. Two sentences is insufficient.

We expanded the introduction to the presented data (lines 226-229). Please advise if this is what you meant.

**Reviewers' comments:**

**Reviewer #1:**

*Manuscript Summary:*

This is a very strong paper and fits in well with this journal on visualization.

*Major Concerns:*

N/A

*Minor Concerns:*

N/A

*Additional Comments to Authors:*

N/A

**Reviewer #2:**

*Manuscript Summary:*

The authors present an elegant way of manipulating superconducting vortices which may guide future works where removing or controlling vortices in other materials or devices could be useful.

*Major Concerns:*

1) Mention that these are superconducting vortices right away in the abstract.

We clarified that in the abstract (line 49).

2) In one place the authors say thousands of vortices, which seems to be unrealistic for manipulating such a large number of vortices.

We added a sentence to clarify that (lines 226-229).

3) The table needs a better formatting: lines, text alignment, another column explaining what each component is for.

The table was a template we filled. However, we resubmitted the table and added a version with better formatting.

*Minor Concerns:*

A suggestion only: add a flow diagram to describe better what each component (in the table) function is.

It seems unclear what "by local contact" means in the abstract. Perhaps, "by local elastic deformation" would be more appropriate if that is the underlying mechanism for the vortex manipulation.

The table was a template we filled. We rephrased to “local physical contact” to clarify “local contact” (line 53).

We thank the referee for his\her helpful comments.

*Additional Comments to Authors:*

N/A

**Reviewer #3:**

*Manuscript Summary:*

This manuscript describes a method for moving vortices using a scanning SQUID microscope.

*Major Concerns:*

N/A

*Minor Concerns:*

Reference 3 is the same as reference 5

We changed reference 5, so it is now the correct one (lines 319-323).

*Additional Comments to Authors:*

N/A

We thank the referees, and we hope the revised version is suitable for publication.

Sincerely,  
Eylon Persky

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