Measurements of the sample vibration in the material science station of Artemis

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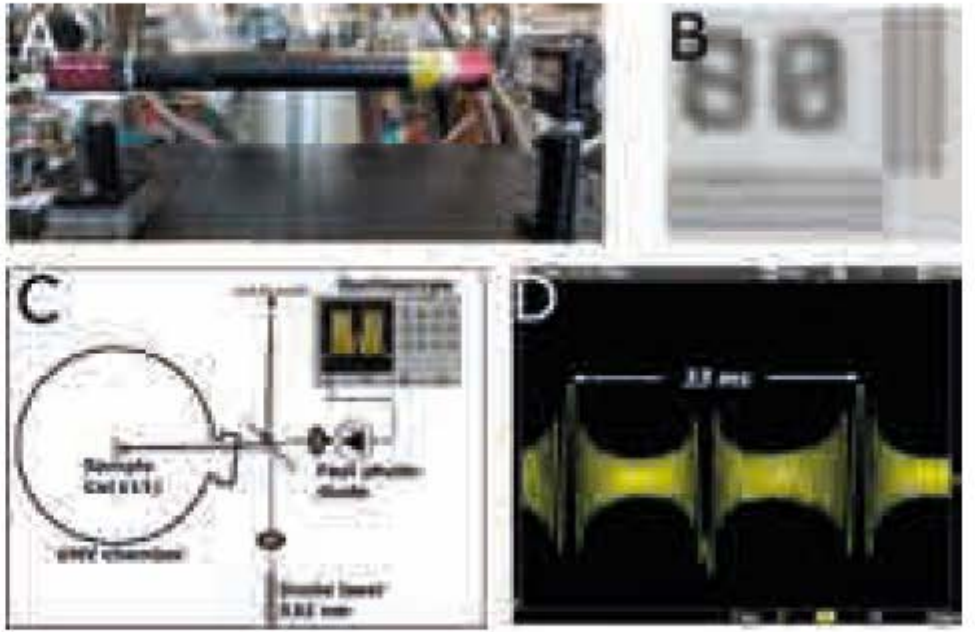
The vibration of the sample stage on the manipulator of the material science station at Artemis is measured by two methods: a microscope, and a Michelson interferometer. The amplitude of sample vibration is found to be smaller than 3 μm with all four turbo pumps on, but two scroll pumps off. The running of scroll pumps introduces a sample vibration as large as 10 μm.

This work ensures the current manipulator is suitable for angle-resolved photoemission spectroscopy (ARPES) with small spot sizes ("micro-ARPES") down to 10 μm, and helps us to understand — so as to minimize — vibration transfer in the design of the new Artemis laboratory.



A. The microscope to monitor the vibration of samples.
B. An 80 line pairs/mm resolution test pattern is shown in the image. It is blurred due to the 10 μm vibration induced by the scroll pumps.
C. The schematic of Michelson interferometer setup.
D. The interference signal of the vibration induced by the scroll pump.

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