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Determination of a reliable metrology method to characterize a sphere of confusion in the hundred of nanometer range

Thursday 18 September 2025 16:40 (1 hour)

We designed a new diffractometer with the willing to establish new standards for the exactitude and speed. This goal drove us to implement, as main rotation stage, an air bearing rotating up to 1000°/s with a sphere of confusion of the hundred of nanometer range. Achieving such performance requires not only cutting-edge technical development and manufacturing of the device itself, but also the proper metrology set-up to control the performance of the rotational stage. The exactitude to reach made us questioning the metrology procedure used for rotation stages. As a result, our work has aimed to establish robust procedure applicable when high precision rotation stage is involved such as in diffractometer for X-ray or neutron diffraction (powder or crystal) or the the trending nano-tomography or nano X-ray imaging. We will present our results for three different methods. We established one method using the embedded high resolution viewing device (on-axis camera) in visible light (possible daily use) that we compared with two others, one using capacitive sensors and one relying on interferometry to get the most accurate metrology.

Footnotes

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