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Dear Editors,

Please find enclosed our manuscript entitled **"X-ray phase-contrast imaging at 100 keV on a conventional source"** that we wish to be considered for publication as research report in the Proceedings of the National Academy of Sciences USA.

We have found a new method for X-ray phase-contrast imaging at high diagnostic energies, i.e. at 100 keV or higher.

Up until now, phase-contrast imaging has been demonstrated at energies up to 85 keV using different techniques. Our method is based on a novel grating design and arrangement approach for a Talbot-Lau type grating interferometer. The method introduces an "edge-on illumination" approach of circularly aligned grating structures. "Edge-on illumination", as opposed to "face-on illumination" which is the standard approach, enables the fabrication of high grating aspect ratios which are necessary for imaging at high energies. The fabrication of such high aspect ratios is challenging in standard "face-on illumination" and currently not available. In addition to the "edge-on illumination" approach, the grating design involves circularly aligned grating structures which are necessary to enable a large field of view in the horizontal direction. Without circular alignment, the extreme aspect ratios would significantly reduce the field of view.

We report about the design of the new gratings used for the "edge-on illumination" approach, which is clearly more challenging than for the standard approach. A laboratory arrangement has been set up for the proof of principle of the method, consisting of a high energy X-ray tube (160 kV voltage) and a caesium iodide scintillator-based detector. First imaging results at 100 keV design energy in absorption, phase and dark-field contrast are presented, showing a potential application of this new technique.

These promising results triggered our decision to consider PNAS to communicate this achievement.

We look forward to hearing from you at your earliest convenience and, for any additional information or clarification you might need, please do not hesitate to contact me.

Yours faithfully,
Prof. Marco Stampanoni
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