Dr. Congcong Huang
Associate Editor
Nature Communications
Unit 10-11, 42F, The Center
989 Changle Road, Xuhui District
Shanghai, China, 200031

October 24th, 2013

Dear Dr. Huang,

We refer to your communication of October 23, concerning our appeal to the negative decision about our manuscript NCOMMS-13-09247-T. We are very happy to grasp that you are now essentially welcoming a revised version of our paper, provided we also submit a comprehensive, point-by-point reply to the reviewer's comments as well as a letter explaining why we are strongly convinced that our manuscript warrants further consideration by Nature Communications. Our arguments on this are presented in the following. We would like to reiterate first the reasons for our appeal and then we would like to highlight the achievements obtained in our work to justify our claims for further consideration.

The reason for our appeal was triggered by the motivations raised by the reviewers against our work, which we found not fully correct and, in some cases, even too simplistic or simply wrong.

Referee one actually would welcome a revised manuscript, which would address his/her comments and is not advising a rejection a priori. The mentioned work of Stutman *et al*. has an intrinsic limitation (the tilt angle) which our approach does not have. Exactly this issue prevents the method of Stutman to achieve sufficiently high-aspect ratio *and* curved profiles at the same time, something that our method easily can. The problem mentioned on the contrast below the soldering points can be explained by beam-hardening in the absorption image. We have amended the manuscript accordingly, providing more information as requested.

Referee two is skeptical about the visibility achieved in our experiment compared with the work from Pfeiffer's group. He/she might not have noticed that our data have been obtained on a commercially available X-ray tube, while the cited experiment of Pfeiffer's *et al*. has been carried out at a third generation synchrotron source, where notably unsurpassed beam conditions can be created which are far from what one can expect in real life (i.e. with conventional X-ray tubes). And, even if one would like to still carry out this (unfair) comparison, we should mention that our experiment is the *first* measurement of its kind with the first generation of gratings made according to our innovative design. Pfeiffer's team uses gratings obtained after almost a decade of development and, despite this and the use of a synchrotron, they are not really further than us while they still carry the intrinsic limitation of a limited grating height. We are well aware that the quality of

our images has still to be improved, but here we are presenting the first experiments with edge-on grating illumination: we describe its great potential but also mention its (temporary) limitations. The same reviewer also complains about the limited field of view (FOV) our method is supposed to have. This is actually wrong, since the horizontal FOV is just limited by the size of the wafer (as for other methods) while the vertical FOV is covered by a vertical scan of the sample, i.e. not limited at all, and, even more important, it becomes very interesting when CT applications are considered (all modern CT systems combine a line (or few lines) detector with a patient translation). Reviewer 2 finally admits that in comparison with a coded-aperture based experiment at 100 kVp our images (taken at 160 kVp) are better, which we of course appreciate. We believe that novelty in the approach must be the driving factor in judging the suitability of our work for this journal and not the present limitations of the technology (which can be solved!), as reviewer 2 seems to conclude.

In our opinion, referee three weighed the technicalities and related limitations of our experiment too much, without considering the innovative solution that we are introducing. As mentioned above, we are perfectly aware of the constraints of the present system but here we are showing the feasibility of a novel approach, which of course needs to be optimized to reach a broader usage. He/she mentions, as comparison, an ABI experiment performed at the tungsten 60 keV Kalpha line. We appreciate this hint and will be happy to integrate it in our revised discussion but we would like to already point out that our experiment was carried out at 160 kVp, with a nominal energy around 100 keV. This is significantly higher than 60 keV. We are not aware of any ABI setup operated at 100 keV on a conventional X-ray source, so the comparison does not sounds very fair either.

Finally, we would like to highlight the pioneering character of our work. All the gratings-based X-ray phase contrast papers published in the past decade report on experiments carried out in the face-on-configuration or light modifications of such. We are the first team demonstrating that an edge-on approach can be successfully implemented and we clearly describe the advantages of this novel approach compared to the status quo. We are firmly convinced that the potential of our method is huge, since it can solve all the open issues (high-energy imaging, no intrinsic aspect ratio limitation in beam-direction, acceptance of spherical wave profile, scanning and spiral-CT compatible geometry just to cite a few), which have been preventing gratings-interferometry to establish itself on commercial, table-top X-ray systems so far.

For the above-mentioned reasons, we are gently asking you to consider our improved, revised manuscript for publication in Nature Communications.

On behalf of the authors,

M. Stampanoni