



ID de Contribution: 56

Type: **Poster**

## Phase contrast imaging on X-ray laboratory source

*lundi 9 mai 2016 15:30 (1 heure)*

X-ray phase contrast imaging, in addition to classical attenuation imaging, has a lot of interest due to its high differentiation capability for low density materials. However, despite classical radiography, phase signal has to be retrieved by adding experimental material and/or applying sophisticated phase retrieval algorithm [1]. Best performances are achieved on synchrotron source but in medical or industrial context, application on X-ray laboratory source has a real interest. Our approach is based on multilateral interferometric technique [2]. This technique consists in measuring the phase gradient in at least 2 orthogonal directions with a single phase grating. The phase retrieval treatment can be made in the frequency domain due to the regularity of the grating. A strong property of this technique is the redundancy in the wave front measurement [3]. In this way direct noise evaluation, phase dislocation and frequency under-sampling indication can be proceeded and taken into account during the phase retrieval procedure.

[1] A. Momose, "Recent advances in x-ray phase imaging", Japanese Journal of Applied Physics, 2005.

[2] J.Primot, "Three-wave lateral shearing interferometry", Applied Optics, 1993.

[3] J. Rizzi et al, "X-ray phase contrast imaging and noise evaluation using a single phase grating interferometer", Optique Express, 2013.

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**Classification de Session:** Poster session

**Classification de thématique:** Nuclear Physics