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# Measurement of Phase and Topological Properties of OAM Channeling Radiation through Asymmetric Lateral Coherence

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Even though the generation of radiation carrying Orbital Angular Momentum (OAM) has been made both with visible light [1] and with millimeter-waves [2], the practical realization of high brilliance X-ray vortices is an open problem. The main limitation is related to the damage threshold of the optical elements.
Novel approaches to generate OAM X-ray by using relativistic beams interacting with ultra-high power lasers [3] brought absolutely new challenges for the development of measuring methods.
The real part of the coherence factor of an OAM radiation provides a direct measurement of the phase properties and topological charge of X-ray vortices, in fact the number of azimuthal lobes of the coherence factor increases as the topological charge is increased, thus providing a suitable method to diagnose X-ray beams with orbital angular momentum produced by ultra-relativistic beams in channeling phenomena. We show a novel diagnostic technique based on scanning interferometry called Asymmetric Lateral Coherence [4][5] to accurately measure the real part of the complex degree of coherent of X-ray OAM radiation.

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