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Building 49, Seminar Room (108)

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Diffraction focusing elements development and manufacturing for hard and soft X-rays at SOLEIL synchrotron

In this talk I will present the results obtained during my postdoc at Synchrotron SOLEIL where I was responsible to organize technological base for the fabrication of required diffraction optical elements. I will report on the results of fabrication of circular germanium-based zone plates. In addition, I will discuss the results of numerical calculations of the behavior of zone plates with real topology in real experimental conditions. The software used for calculations allows taking into account the undercut of zones that occurs after plasma-chemical etching and also variations of the height of zones. Such variations could be used to correct or improve zone plate efficiency after electroplating or plasma-chemical etching, or by focused ion beam (FIB) etching. The results on manufacturing PMMA circular zone plates (and PMMA illuminator) along with some steps in Ni soft X-ray zone plate fabrication by electroplating in PMMA moulds will also be presented.

Part of the talk will also be dedicated to my PhD work partly done at The University of Manchester on graphene.