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Multi-Foil X–ray optics tests at PANTER: Preliminary results

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Abstract. We present and discuss preliminary test results performed with selected modules of Multi–Foil X–ray Optics in the MPE PANTER X–ray test facility. Three X–ray optics Multi–Foil modules were tested, namely 1D Kirkpatrick-Baez module, 2D Kirkpatrick-Baez module, both developed within the EU Horizon 2020 AHEAD Project, as well as the Lobster–Eye module REX for the rocket flight experiment.

Key words: X–ray optics – X–ray telescopes – X–ray test facilities – X–ray astrophysics

1. Introduction

In this short contribution, we present very preliminary results of tests of selected X–ray optics in Multi–Foil Optics (MFO) arrangements, namely Kirkpatrick-Baez (KB) and Lobster-Eye (LE) (Hudec, 2010; Inneman et al., 1999) test modules in the MPE PANTER X–ray test facility in Neuried, Germany (Burwitz et al., 2013, 2017; Freyberg et al., 2008). In these full aperture X–ray optical tests, two KB modules and one LE module were tested. The very preliminary results are briefly summarised below.

2. AHEAD WP on X–ray Optics

The work within the optics works package of EU AHEAD project (Piro et al., 2015) comprises studying, simulating and ray tracing the current optical design possibilities for three X-ray optics geometries, namely Wolter–I, Kirkpatrick-Baez, and Lobster-Eye. An assessment and modeling of inherent aberrations of the investigated technologies will be performed to determine a detailed error budget break-down of all the contributions which limit the angular resolution, size of the field of view and collecting area. A detailed simulation of instrument response for all cases will allow a prediction of the scientific performance. Also studies of different substrates Si vs. Glass for the KB modules will be carried out. For all the tests the setup geometry in PANTER will be optimised for each optic and the analysis software modified so that the consistency between measurement and simulations can be adequately checked.