Czech Contribution to AHEAD2020: A Summary

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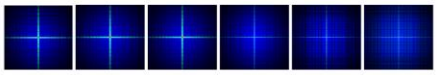
LE ray tracing by LOPSIM

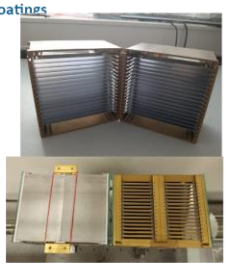
Ray tracing of LE module 1 to 17 keV by LOPSIM .. Newly developed code by Tichy V. see Tichy V. talk for details



III. HORUS – KB test experiment with Si and different coatings

- 4 modules were prepared
  - 2 modules with Au surface
  - 2 modules with Ir surface
  - each module 17 silicon foils
- X-ray tests in preparation
- Goal
  - experimentally compare different reflective layers
  - 4 x 17 Si wafers 0,625 mm thick aperture 85 x 65 mm f 2 m

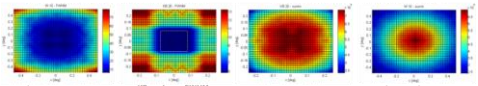
Collaborative effort CTU in Prague, Rigaku Prague, and Aschaffenburg University Student experiment/PhD of Veronika Stehlikova.



Main activities

- Simulations and designs of LE (Lobster Eye) and KB (Kirkpatrick-Baez) Systems
- New and alternative simulation/ray tracing methods
- Studies of alternative/improved coatings
- Improved substrates (Si and float glass)
- Design and assembly of new test modules
- Both LE as well as KB test modules
- based on Multi Foil Technology (glass and Si substrates < 1 mm)
- Tests in visible light and in X-rays

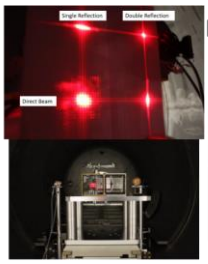
Comparison K-B vs. Wolter



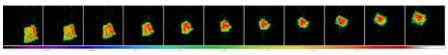
	D [m]	A [m²]	F [m]	A_{eff} [m²]*	A_{rel} [%]**	A_{eff} [m²]***	A_{rel} [%]**
W10	dia 1.8	2.6	10	0.70	26.63	0.66	25.11
W20	dia 3.6	10.9	20	2.83	25.89	2.76	25.26
KB20	1.8 x 1.8	3.3	20	0.93	27.80	0.62	18.49
KB40	3.6 x 3.6	13.9	40	3.11	22.33	2.46	17.66

* for detector 100 x 100 mm
** proportion of effective area to aperture
*** for peak (area 4 x 4 mm)

K-B vs. Wolter: comparable ef area at f = 2f, comparable angular resolution... candidate for random-sat fligh

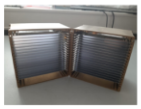


HORUS at PANTER

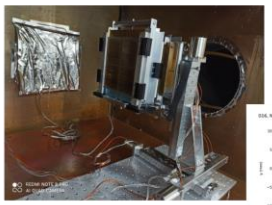


MFO Multi Foil Optics

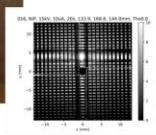
- Both LE in Schmidt design as well as KB optics are assembled from large number of thin (< 1 mm) substrates
- Float glass and/or Silicon wafers
- LE – glass or Si polished from both sides
- KB – glass of single side polished Si



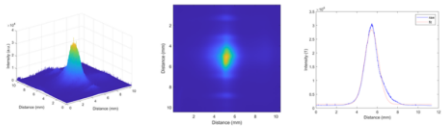
LE test module X-ray tests in Prague, VZLU facility



Small X-ray test facility at VZLU in Prague, 10 m long



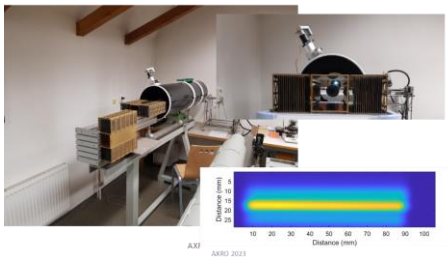
LE X-ray tests in Prague VZLU III



The best focus (left and middle) and the FWHM estimation (right)

Large KB system with 380 Si substrates

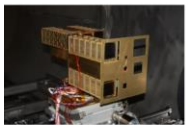
KB optical VIS tests at CTU in Prague

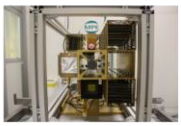


Group Photo AHEAD WORKSHOP PRAGUE 2023

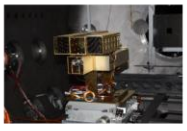
IV. Large KB Module

- Developed in collaboration with Rigaku Prague, assembled and manufactured by Rigaku
- Si wafers as substrates, one side polished and coated, in total 380 wafers
- Test of large KB array with large (380) number of substrates

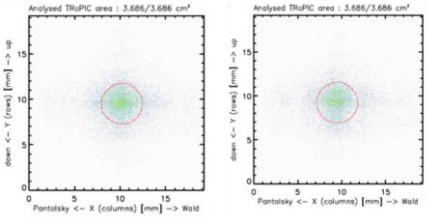




KB module at PANTER



KB PANTER tests



2D main focus at 4.5 keV (left) and 8 keV (right). Results still in verification/evaluation.

Conference photo

IBWS2024 AHEAD SCHOOL

R. Hudec for SOC&LOC

IBWS2024 & AHEAD SCHOOL, Cheb, May 13-17, 2024
Photos by Ondřej Nentvich, Rosa Poggiani and René Hudec

STUDENTS GONG SESSION