

GRANITE BENCHES FOR SIRIUS X-RAY OPTICAL SYSTEMS

R. R. Geraldes⁺, A. Sikorski, C.S.N.C. Bueno, M.Saveri Silva, G.V. Claudiano, V.Z. Ferreira, L. Sanfelici, M.S. Souza, L.M. Volpe, H. Westfahl Jr., Brazilian Synchrotron Light Laboratory (LNLS/CNPEM), Campinas, São Paulo, Brazil





The first set of Sirius beamlines is expected to start operating in early 2019 and over the last few years many optical systems for the X-ray beamlines have been developed in-house at the Brazilian Synchrotron Light Laboratory (LNLS). Starting with the High-Dynamic Double Crystal Monochromator (HD-DCM), passing by the Double Channel-Cut Monochromator (4CM) and continuing with new standard mirror systems, a series of granite benches, based on high-resolution levellers, and a combination of embedded and commercial air-bearings, has been designed for high mechanical and thermal stability. Specifications, de-signs, simulations and partial results are presented, showing the progressive increase in complexity according to a deterministic design approach.



DoF	Range (<i>mm</i>) (<i>mrad</i>)		Resolution (µm) (µrad)		Accuracy (μm) (μrad)		Stability (RMS) (µm) (µrad)	
	А	В	А	В	А	В	А	В
Tx	132	90	0.5	10	10	100	0.5	<1
Ту	20	4	1	3	10	100	1	<1

Rx	3,7	9.8	1	1	5	100	1	2
Ry	10	10	10	1	1	10	0.1	.05
Rz	2,8	19.2	10	2	50	10	3	2



DoF	Resolution (µm/µrad)	Range (mm/mrad)
Tx	5.3	±9
Ту	0.5	± 2.3
Rx	0.8	±5
Ry	1	± 11.5
Rz	1	±5

 Resolution not affected by additional preload ✓ Cross-talk between DoF below 5% of range





- ✓ First modes above 45 Hz
 - Further investigations with shaker
 - Evaluation of damping options
- Decoupling between parts above 450 Hz
- Marginal increase in eigenfrequencies for a factor 3 increase in preload (90kN total)
- Better results expected on Sirius experimental floor





CNPEM





Stability($RMS_{1-450Hz}$) for Monochromators Benches:

4CM Two-stage Bench





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