

LFEUI

Laboratório de Física Experimental em
Unidades de Investigação

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Pedro Assis**

	Setembro	Outubro	Novembro	Dezembro	Janeiro	Fevereiro	Março	Abril	Maiô	Junho	Julho
2ª Feira					1 Ano Novo			1 Férias			1 Férias
3ª Feira					2 Férias			2 Férias			2 Férias
4ª Feira			1 T Santos		3 2ºP			3 Férias	1 Trab		4 Férias
5ª Feira		2		4	1			4 Férias	2		4 Férias
6ª Feira	1		3	1 Indep	5	2	1	5 Férias	3		5 Férias
Sáb	2		4	2	6	3	2	6 Férias	4	1	6 Férias
Dom	3	1	5	3	7	4	3	7 Férias	5	2	7 Férias
2ª Feira	4	2	6	4	9	5	4	8 3ºP	6	3	8 Férias
3ª Feira	5	3	7	5	10	6	5	9	7	4 Fim 3ºP 9º, 11º, 12º	9 Férias
4ª Feira	6	4	8	6	11 ?	7	6	10	8	5	10 Férias
5ª Feira	7	5 Imp. Ren.	9	7	12	8	7	11	9	6	11 Férias
6ª Feira	8	6	10	8 Imac.		9	8	12	10	7 Oeiras	12 Férias
Sáb	9	7	11	9	13	10	9	13	11	8	13 Férias
Dom	10	8	pares	10	14	11	10	14	12	9	14 Férias
2ª Feira	11	9	13	11	15	12 Férias	11	15	13	10 Portugal	15 Férias
3ª Feira	12 1ºP	10	A1	12	16	13 Carnaval	12	16	14	11	16 Férias
4ª Feira	13 1ºP	11	15	13	17	14 Férias	13	17	15	12	17 Férias
5ª Feira	14 1ºP	12	16	14	18 ?	15	14	18	16	13 Sto Ant.	18 Férias
6ª Feira	15 1ºP	13	Leilao		19	16	15	19	17	14 Fim 3ºP 5,6,7,8,10	19 Férias
Sáb	16	14	18	16	20	17	16	20	18	15	20 Férias
Dom	17	15	19	17	21	18	17	21	19	16	21 Férias
2ª Feira	18	16	20	18 Fim 1ºP	22	19	18	22	20	17	22 Férias
3ª Feira	19	17	A2	19 Férias	23	20	19	23	21	18	23 Férias
4ª Feira	20	18	22	20 Férias	24	21	20	24	22	19	24 Férias
5ª Feira	21	19	23	21 Férias	25 ?	22	21	25 Liberdade	23	20	25 Férias
6ª Feira	22	20	24	22 Férias	26	23	22 Fim 2ºP	26	24	21	26 Férias
Sáb	23	21	25	23 Férias	27	24	23	27	25	22	27 Férias
Dom	24	22	26	24 Férias	28	25	24	28	26	23	28 Férias
2ª Feira	25	23	27	25 Natal	29	26	25 Férias	29	27	24	29 Férias
3ª Feira	26	24	28	26 Férias	30	27	26 Férias	30	28	25	30 Férias
4ª Feira	27	25	29	27 Férias	31	28	27 Férias		29	26	31 Férias
5ª Feira	28	26	30 Doc Prep	27 Férias		29	28 Férias		30 Corpo	27	
6ª Feira	29	27		29 Férias		29 6ºSanta		31	28 Fim 3ºP resto		
Sáb	30	28		30 Férias		30 Férias				29	
Dom		29		31 Férias		31 Páscoa				30	
2ª Feira		30									
3ª Feira		31									

Calendário LFEUI 2023-2024

- P1: Portefolio de experiências do DF
- 14 Nov: Aula 1
- Até 17 Nov: Validação de experiência extra-portefolio
- 17 Nov, 18h: Leilão Final Experiências
- 21 Nov, 16h30: Aula 2 sobre Desenho de Experiência, Dúvidas
- 30 Nov : Documento Plano/Objectivos Experiência entregue aos PIs da experiência
- 4 Dez-14 Jan 2021: Realização da experiência
- Data da oral -7 dias: Relatório da experiência
- Orais: Por Zoom, semana 8-12 Jan ou 15-19?



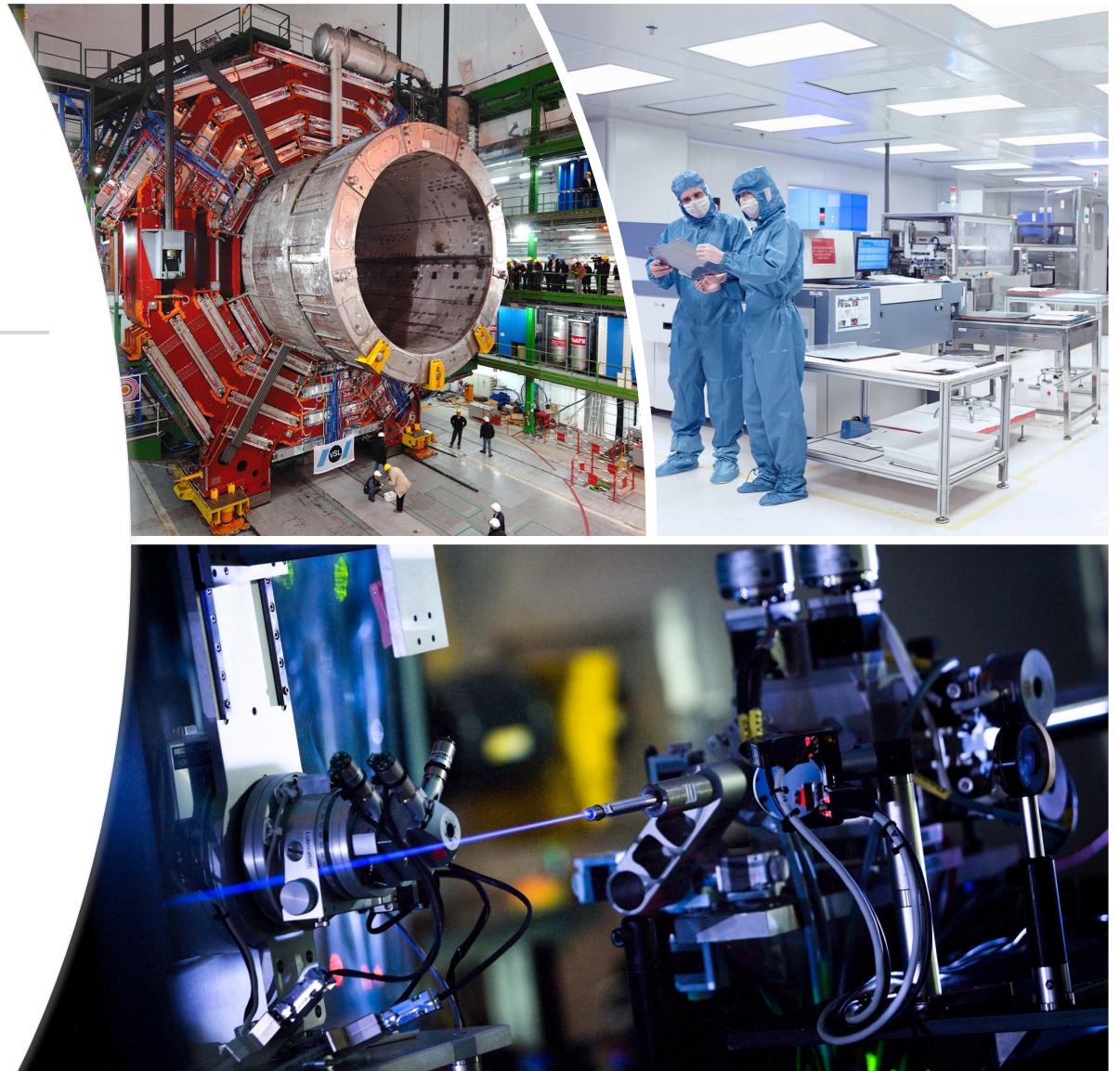
Propósito do documento de preparação

- Mostra aos Hosts que estão prontos para realizar a experiência
- Deve ser entregue no máximo dia 30 de Novembro.
- Segue o tipo de documento usado nas Infraestruturas de acesso “Proposal for Beamtime”

Grandes experiências em *large scale facilities*

- High Energy Physics (CERN, fusion, Ion colliders)
 - Light sources (synchrotron, spallation source, Lasers, XFELs)
 - Material science (Nanotechnologies)
 - Biology and environment
 - Test facilities (Ex: particle accelerator test facilities)
 - Super computers
-
- Check

<https://roadmap2021.esfri.eu/projects-and-landmarks/browse-the-catalogue>



User facilities

Muitas infraestruturas experimentais funcionam como **User Facilities**

Isso significa que disponibilizam o seu tempo para utilizadores externos à infraestrutura

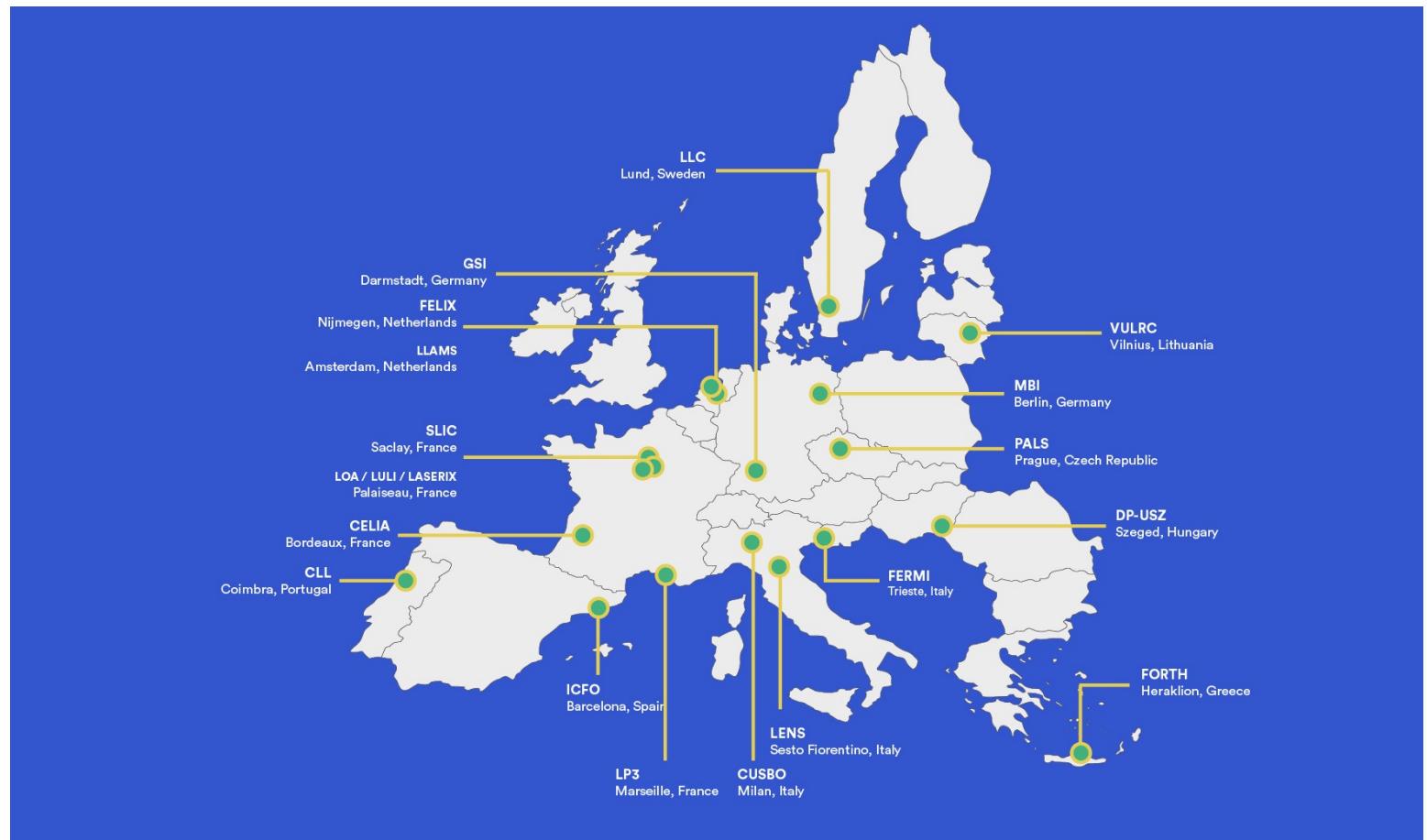
Porquê?

- Asseguram competição pelas melhores ideias
- Acrescentam know-how tecnológico (user-assisted commissioning)
- Aumentam o seu impacto na sociedade
- Requerido pelos financiadores

All proposals are peer-reviewed and rated, and beam time is allocated using the scores of these reviews. Once time has been allocated, the beamline staff schedule the proposals.



Ultrafast / High Power lasers, for Plasmas, Photonics, Material Science, Biology





Beamtime

Exemplo: Uma experiência no LCLS, SLAC
Começa por um “proposal” com a motivação

- Proposal
- Committee
- Feasibility
- Detailed design
- Security clearance
- Setup
- Beamtime
- Analysis
- Publication



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Exemplo: Uma experiência no LCLS, SLAC
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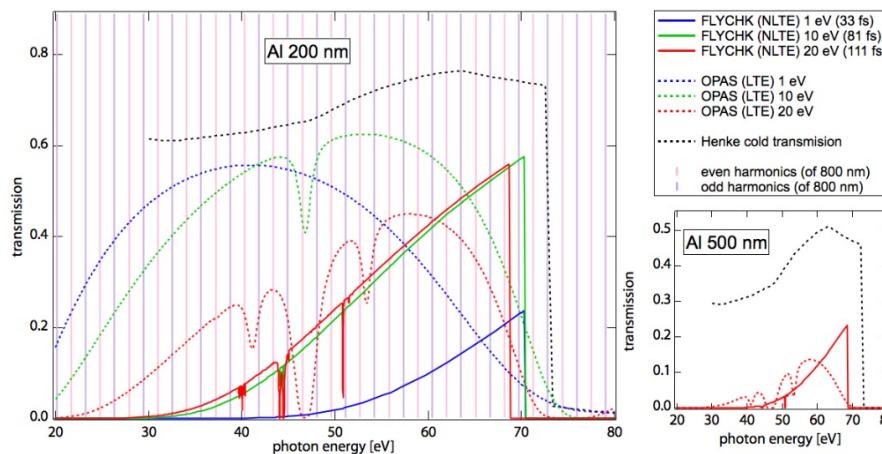
Ultrafast time resolved measurement of the complex refractive index of solid density matter heated by the LCLS

A. ABSTRACT

This proposal is a resubmission of previously passed [LA27](#) (Tier 3), in which the major technical milestones and theoretical improvements have been addressed to streamline the operation of the experiment.

X-rays of intensities never before accessible in the laboratory are now available, making possible the creation of exotic states of matter with immediate relevance to current applied and research fields, such as ICF and astrophysics, respectively. Research into these states has already been demonstrated at other facilities, such as the induced transparency of solid Al at DESY [1], and more recently the complete ionization of Ne from the inner to the outer shell electrons at the LCLS [2]. These results were both firsts in the study of high intensity X-ray interaction with matter, and highlight the future potential for using intense bursts of X-rays to drive matter into new states at the LCLS. While groundbreaking experiments are being designed to use the high

table new Equation of State data [3],
That is, what are the basic properties



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Exemplo: Uma experiência no LCLS, SLAC

Detalha como se faz uma medida original

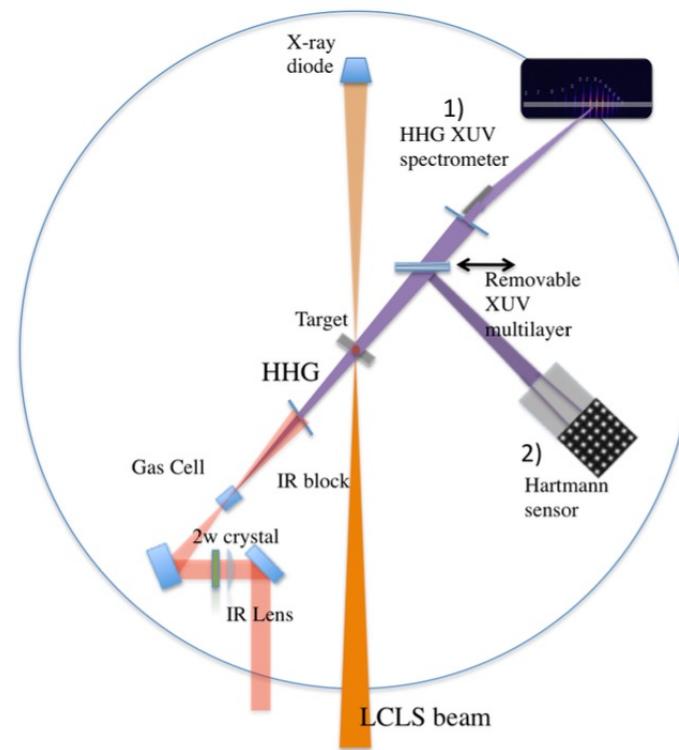
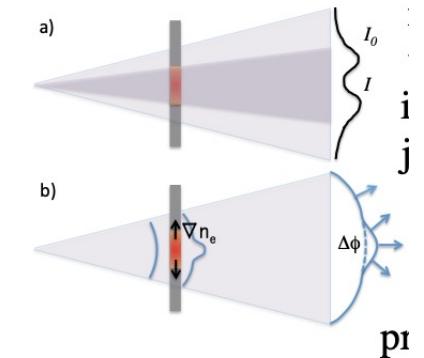


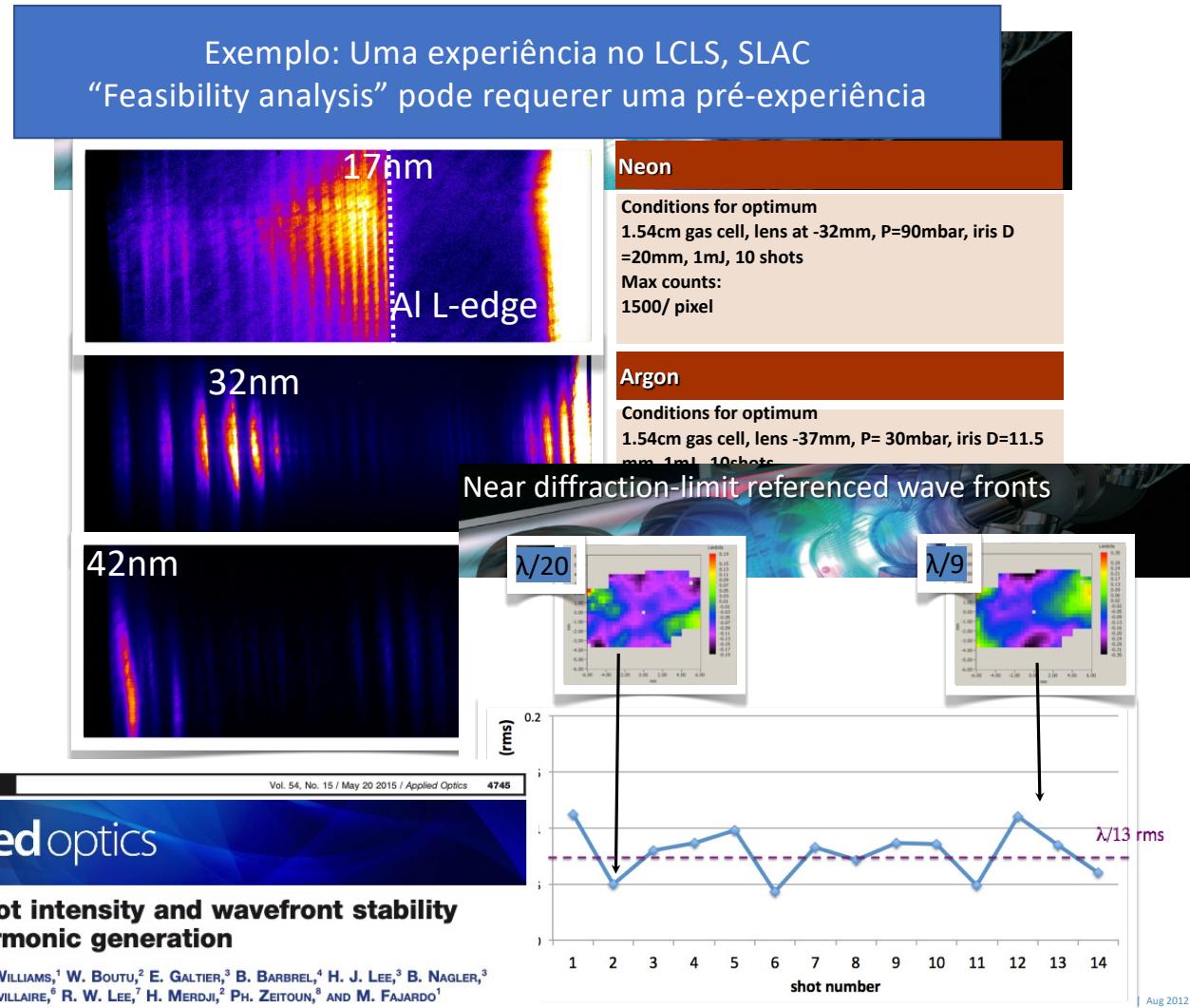
Figure 3. Experimental setup (not to scale)

generated by model.
2) laser-gas interaction easily implemented short pulses of XUV spectrum at odd frequency. HHG are Ar and >70 eV for 1 ~40 fs duration pulses MEC station, a coherence than 40 fs duration can



Beamtime

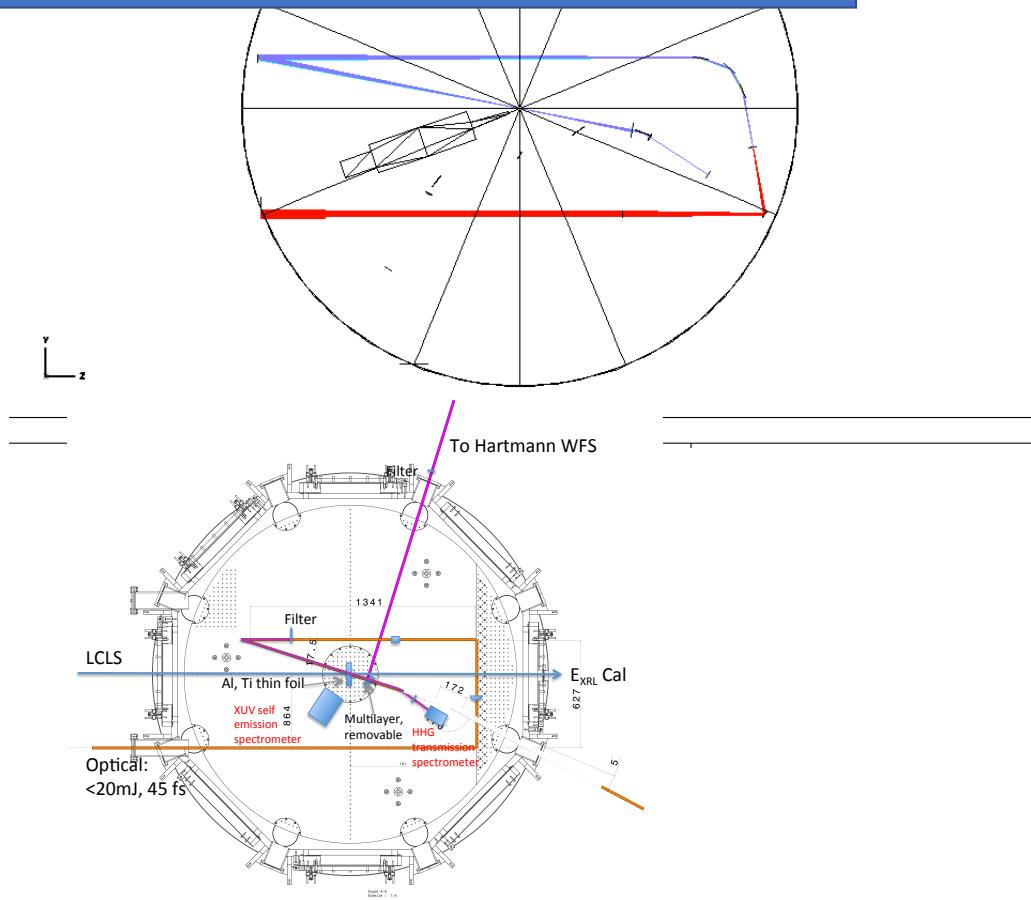
- Proposal
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Beamtime

- Proposal
- Committee
- Feasibility
- **Detailed design**
- Security clearance
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Exemplo: Uma experiência no LCLS, SLAC
Nos meses que antecedem a experiência é preciso fazer o desenho detalhado e uma checklist com todos os elementos



Beamtime

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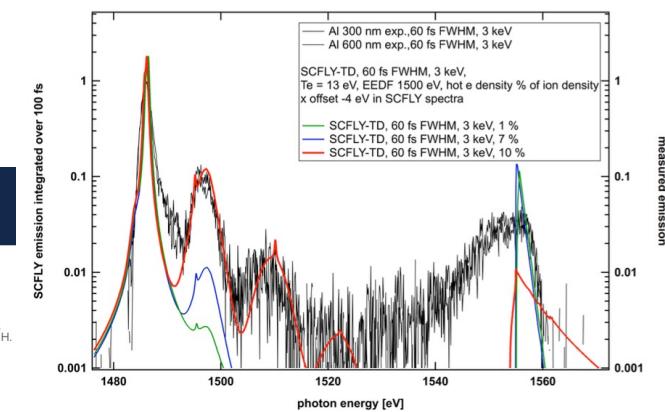
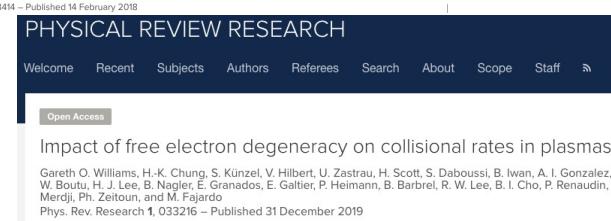
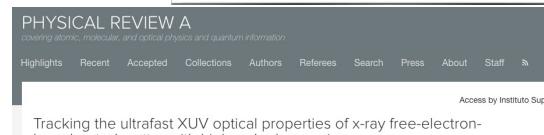
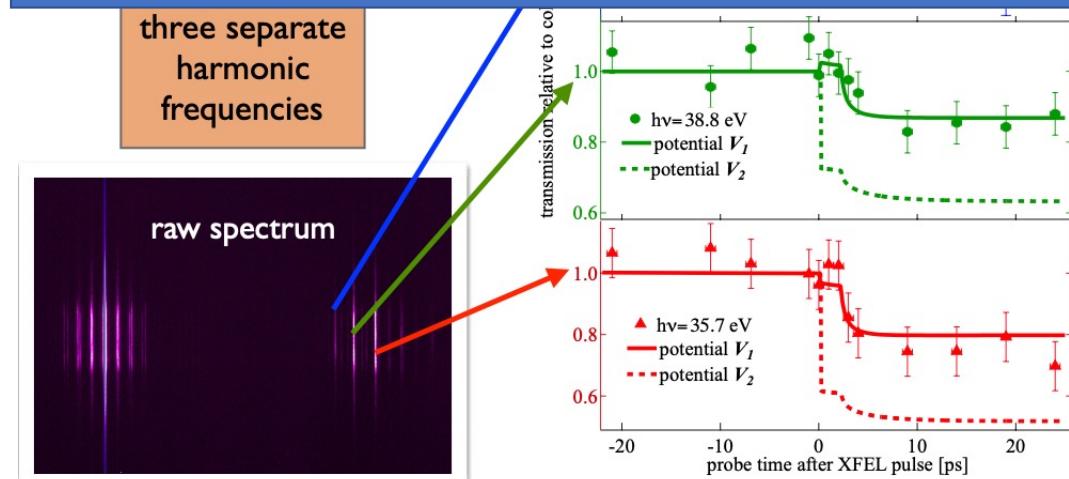
Shot plan, priority list

	(Com.)	(Com.)	(Com.)	Copper	Iron	Titanium
No XFEL						
	Gas exchange Calibration	CRL focus Imprint	CRL focus Imprint	P1 • $hv = 9900 \text{ eV}$	P1 • $hv = 8600 \text{ eV}$	P1 • $hv = 6000 \text{ eV}$
	Energy check Hw	CRL focus Imprint	CRL focus Imprint			
	CRL focus Imprint	CRL focus Imprint	CRL focus Imprint	P2	P3	P3
	CRL focus Imprint	CRL focus Imprint	CRL focus Imprint			
				P2	P2	
No XFEL	No XFEL	No XFEL	No XFEL	spec. change Target change	spec. change Target change	No XFEL

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Exemplo: Uma experiência no LCLS, SLAC
Finalmente a análise de dados resulta em comunicações orais (-> a vossa apresentação) ou artigos (\rightarrow o vosso relatório)



Beamtime

Mesmo num University-scale lab é preciso um plano!

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Scheduled experiments	Subitems	Owner	Collaborato...	Design	Beamtime	Data Analysis	Conference Talk	Paper
Ti WDM pump-probe @VOXEL	1	PE	PI +3	Done	May 21 - Jun 20	Working on it	Invited	
Ti WDM pump-probe @VOXEL (round2)	1	PE	PI +3	Done	Oct 2 - Jan 6	Working on it	Talk	
SolidSHG @VOXEL	1	PE	FL +3	Done	Aug 14 - Sep 30	Done	Poster	Waiting referee
32 nm plenoptic @VOXEL	1	PE	PI +3	Working on it	Mar 1 - 31			
Plenoptic@ DESY 11keV	1	PE	PI +3	Done	Apr 4 - 10	Done		Submitted
Coherent servicing/repair	1	PE	PI +3	Done	Oct 11 - 17			
Astrella Post-compression	1	PE	PI +3	Working on it	Jan 3 - 31			
Moderate electrons @ VOXEL	1	PE	PI +3	Working on it	Mar 1 - 31			
Attosecond holography	1	PE	PI +3		-			
XFEL Experiment @ DESY !!!	8	PE	PI +3	Working on it	Jun 10 - 14			

Past experiments	Subitems	Owner	Collaborato...	Design	Beamtime	Data Analysis	Conference Talk	Paper
Summer Internship Andre	2	PE	PI +3	Done	Aug 30 - Sep 30			
Pulse measurement @VOXEL	2	PE	PI +3	Done	Jun 1 - 21	Done	Poster	Accepted
SolidSHG @LOA	1	PE	PI +3	Done	Oct 2 - Jan 4	Done		Submitted
LIF detector @VOXEL	2	PE	PI +3	Done	Jan 14 - 25	Done		Accepted
Coherence @DESY	1	PE	PI +3	Done	Nov 20 - 29	Done	Poster	Accepted
IR/HH-WF correlation with DM & KB op...	1	PE	PI +3	Done	Jun 27 - Jul 31	Done	Poster	Accepted
High NA WFS	1	PE	PI +3	Done	-	Done	Poster	Accepted

2 page max including Setup,
Calendar, References

Documento de preparação para a experiência*

Proposal summary: aims and scientific basis of the proposal - Scientific background

State clearly the aim of the proposed experiment together with the general and specific scientific background.

Experimental technique(s), required set-up(s), measurements strategy, sample details (quantity,...)

Describe the experimental set-up and requirements. Queries concerning the feasibility (technical or safety aspects) of an experiment should be clarified with hosts before the proposal is submitted.

Safety considerations

Experimental conditions requiring **special safety precautions** such as the use of lasers, high pressure cells, bacteria, dangerous substances, toxic substances and radioactive materials, must be **identified in the proposal**.

Beamtime requested (Lab sessions)

Selection of the apparatus, "shot plan" esquemático

Results expected

Describe the results expected from the measurements, their scientific (or technical) relevance, and how they relate to existing work on the topic.

Concluding remarks

Justify the beam time you request and give technical reasons which make the apparatus necessary for your experiment. Include **REFERENCES** where these are relevant, but do not assume that they will be systematically consulted for essential details.

* Adaptado de ESRF

Write a good proposal!

- https://www.esrf.fr/files/live/sites/www/files/UsersAndScience/UserGuide/Applying/Advice_on_writing_a_good_proposal.pdf

Dois pontos importantes:

Mesmo no ESRF, há um **limite de 2 páginas**:

- “➤ Proposal must be scientifically compelling and competitive!
 - respect template, format and length limit
 - 2 A4 pages, font size 12
 - reviewers see b/w, recto-verso, 2 pages per sheet
 - **proposal rejection if not respected”**

O conselho para validar a experiência com o laboratório de acolhimento é válido no vosso caso também:

- “➤ Consult Beamline Staff
 - target measurements based on beamline; clearly identify how your experiment can be done and whether it can give you the answers you need
 - advice on number of shifts required for each experiment”

2 page max including Setup,
Calendar, References

Documento de preparação

- Entrega 30 de Novembro, ao investigador responsável pela experiência
- Formato: 2 page max including Setup, Calendar, References
- Template: Title/Authors/Abstract; seguido de
 1. Scientific background
 2. Experimental technique
 3. Workplan
 4. Expected results
 5. Conclusion
 6. References