

The LISA Innovative Training Network

Academic Day
CERN 16 June 2022

Bruce Marsh / LISA Coordinator, CERN



LISA

LASER IONISATION AND SPECTROSCOPY OF ACTINIDES



This Marie Skłodowska-Curie Action (MSCA) Innovative Training Networks (ITN) receives funding from the European Union's H2020 Framework Programme under grant agreement no. 861198

Project timeline

Start of funding

Official project end

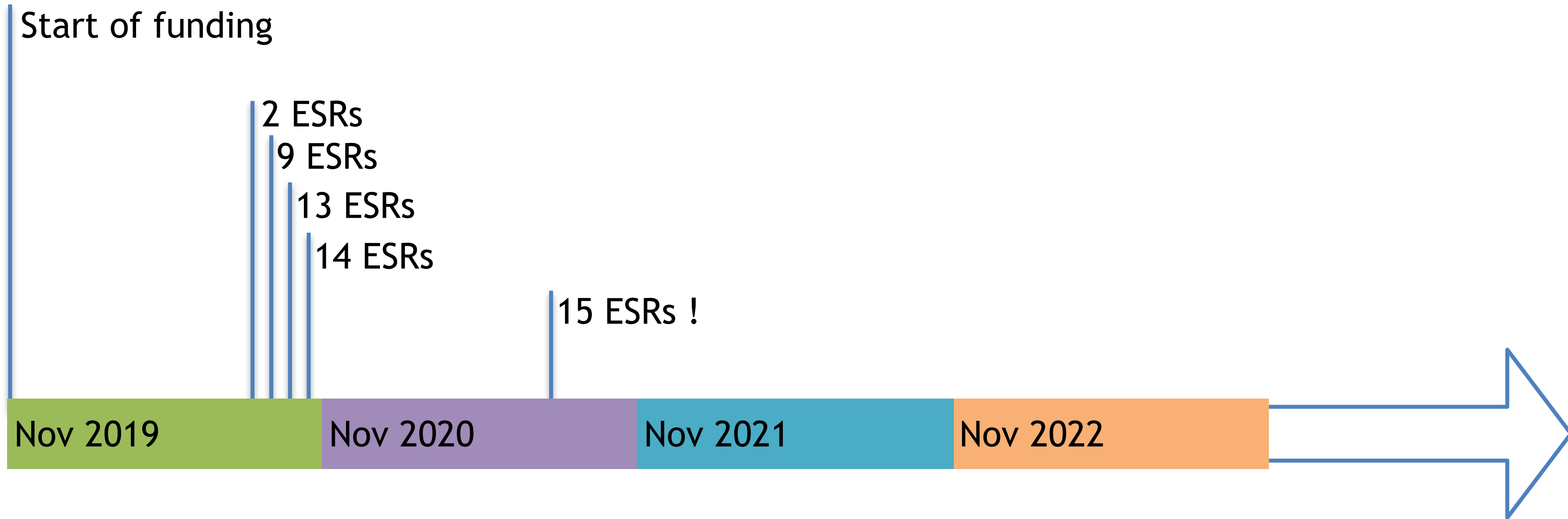
Nov 2019

Nov 2020

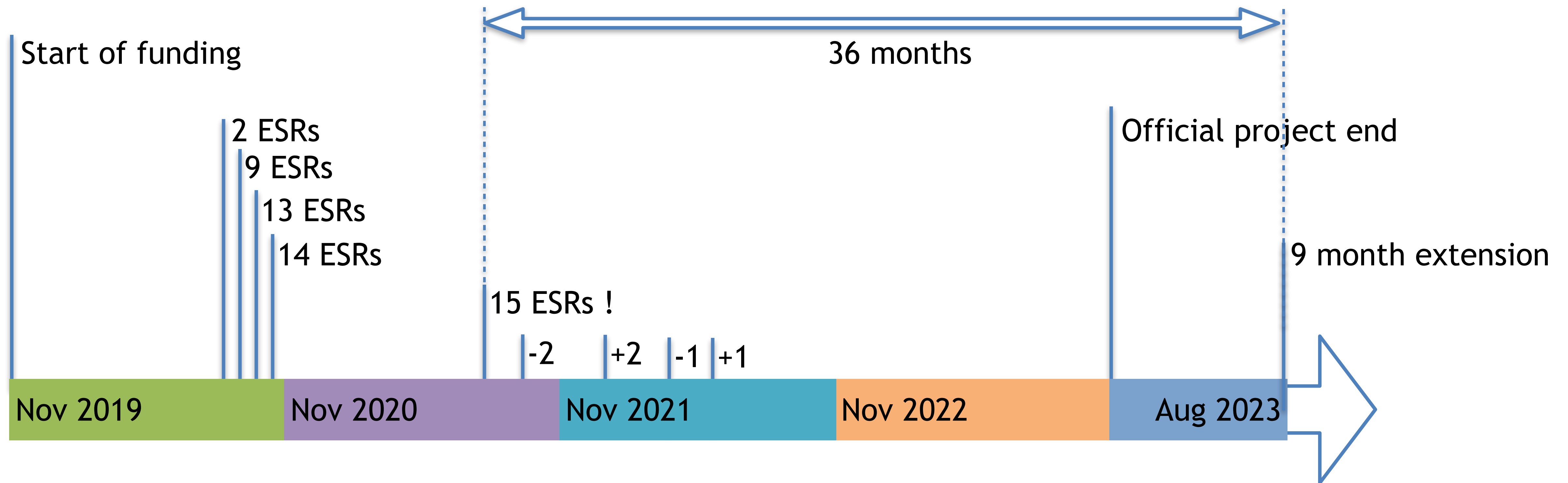
Nov 2021

Nov 2022

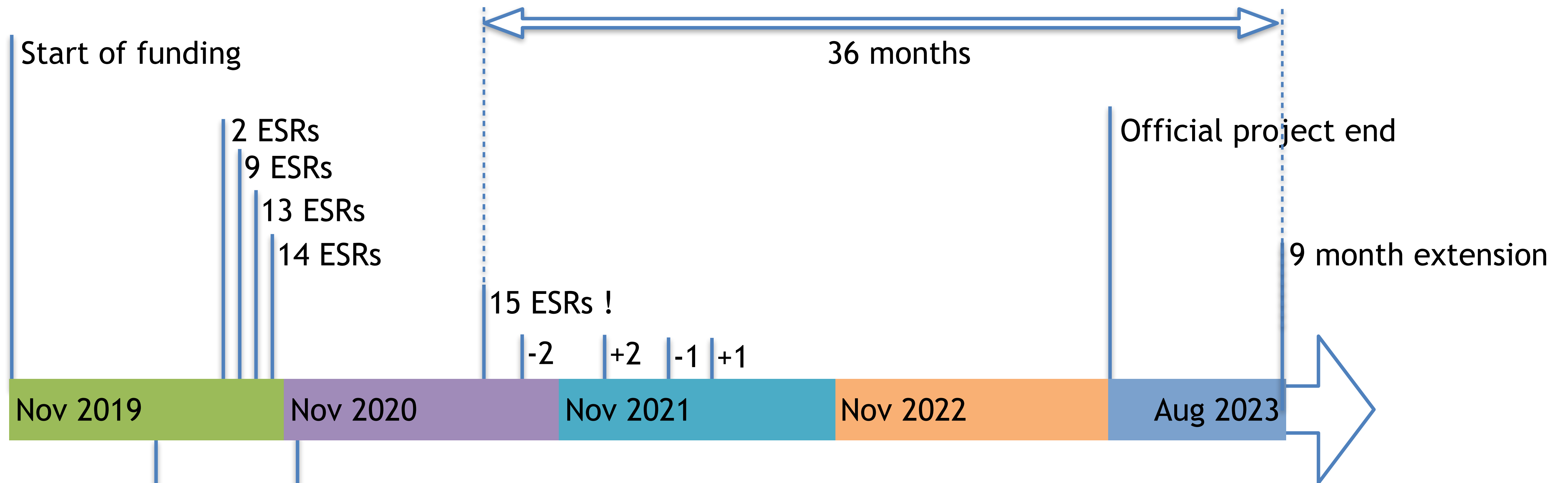
Project timeline



Project timeline



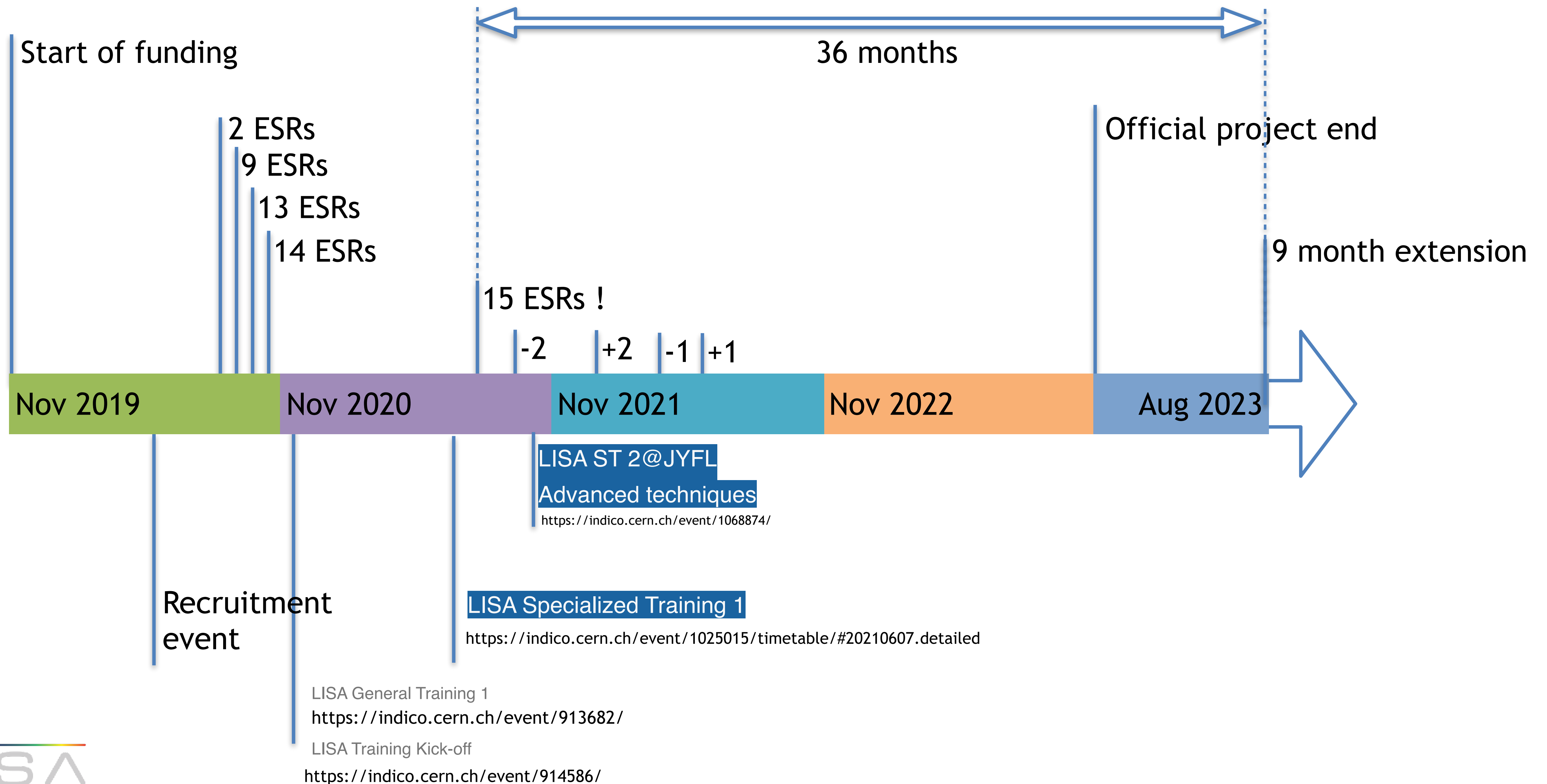
Project timeline



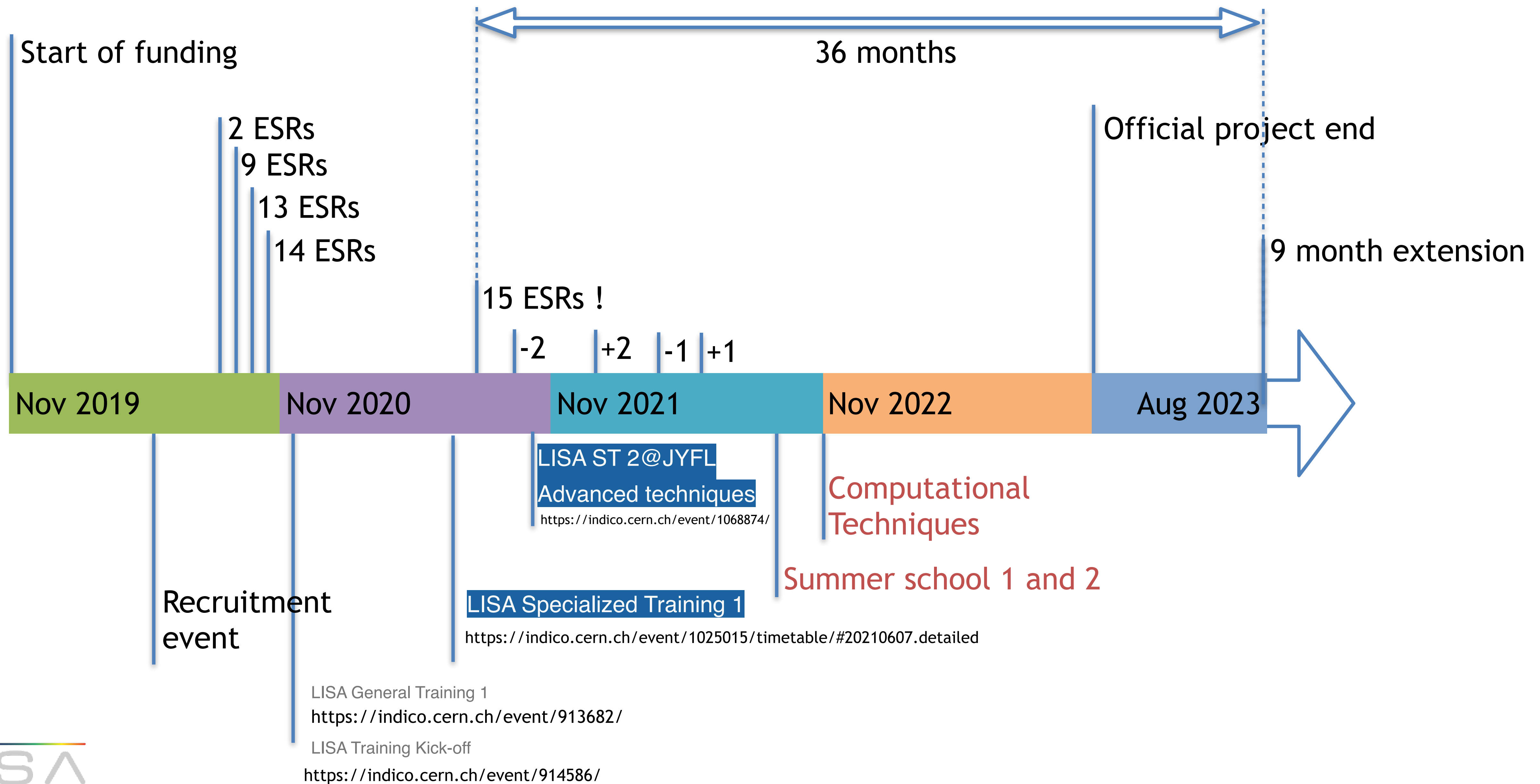
Recruitment event

LISA General Training 1
<https://indico.cern.ch/event/913682/>
LISA Training Kick-off
<https://indico.cern.ch/event/914586/>

Project timeline



Project timeline



Milestones

Milestones			
MS #	Description	Lead	Due (initial)
1	Formation of the Management Office	CERN	31.Dec.09
2	Formation of the Ethics Committee	CERN	30.Jun.20
3	Supervisory Board Meeting 1	CERN	30.Jun.20
4	Project check	CERN	30.Nov.20
5	Evaluation of linewidth customization concepts	HUB	31.Oct.20
6	Standard C-WAVE laser prototype with customized linewidth option	HUB	30.Apr.21
7	Actinide molecules were created and detected	CERN	31.Oct.21
8	First high-resolution off-line laser spectroscopy measurement at CNRS-GANIL	CNRS	30.Apr.22
9	Design of Ti:Sa amplifier	MSL	30.Apr.22
10	On-line test of actinide production, extraction, dissociation and ion beam production	CERN	28.Feb.23
11	Extraction of laser-ionized radium and actinium from CERN MEDICIS	KUL	31.Oct.21
12	Development of high resolution excitation schemes for Pu	LUH IRS	30.Apr.22
13	GUNILLA ion beam apparatus at UGOT made operational for studies of EA of stable isotop	UGOT	31.Oct.20
14	Provide predictions of all experimentally needed properties of Ac, Th, Pa, and U	RUG	30.Jun.21
15	Supervisory Board Meeting 2	CERN	31.Dec.20
16	Supervisory Board Meeting 3	CERN	30.Jun.21
17	Supervisory Board Meeting 4	CERN	30.Jun.22
18	Supervisory Board Meeting 5	CERN	31.Dec.22
19	Technical design of new beamline for installation of GANDALPH at CRIS	UGOT	30.Nov.21
20	Multi-step resonance ionization schemes using Ti:Sa lasers for Th, Pa, U, Np, Am, Cm, Bk, a	JGU	28.Feb.22
21	Optimum filament setup for efficient Lr evaporation	GSI	31.Oct.20
22	Pu targets for JYU	JGU	31.Jan.21
23	Off-line study of atomic transitions in uranium using both dye and Ti:Sa lasers	JYU	30.Apr.21
24	Identification of atomic states in Lr	GSI	31.Oct.21
25	Picoliter injection system	JGU	31.Oct.21
26	Setup for high-resolution in gas-jet laser spectroscopy	GSI	31.Oct.22
27	First high-resolution on-line laser spectroscopy measurement at CNRS-GANIL	KUL	30.Apr.23
28	Compatibility of training program with the different doctoral schools	KUL	28.Feb.21
29	Midterm review of progress from ICDP	KUL	31.Dec.21
30	Branding and design	CERN	30.Jun.20
31	Visibility on social media	CERN	30.Apr.21
32	Network-wide social event	CERN	31.Oct.21
33	Planned recruitments completed	CERN	31.Oct.20

Deliverables

Deliverables, Ethics, DMP, Other Reports						
WP No	Del No	Title	Lead Beneficiary	Est. Del. Date (annex I)	Receipt Date	Status
WP1	D29	Kick off meeting	CERN	31 Dec 2019	20 Jan 2020	Approved
WP1	D30	Recruitment	CERN	30 Jun 2020	10 Nov 2020	Approved
WP1	D31	Assessment from the Ethics committee	CERN	31 Oct 2020	04 Apr 2022	Approved
WP1	D32	Data Management Plan	CERN	30 Apr 2020	08 Jun 2021	Approved
WP1	D33	Summary progress on ESR activities	CERN	30 Sep 2021	19 Mar 2022	Approved
WP1	D34	Consortium Agreement	CERN	31 Dec 2019	22 Jan 2020	Approved
WP1	D35	Supervisory Board	CERN	31 Dec 2019	20 Jan 2020	Approved
WP1	D36	Progress report	CERN	30 Nov 2020	19 Mar 2022	Approved
WP2	D3	Optimized Ti:Sa laser system for high resolution laser spectroscopy	CNRS	31 Oct 2021	19 Mar 2022	Approved
WP2	D4	Implementation of PI-LIST at ISOLDE	CERN	31 Oct 2022		Pending
WP2	D5	Pulsed narrow linewidth Ti:Sa amplifier	MSL	31 Oct 2022		Pending
WP2	D6	Production of actinide isotopes using thick ISOLDE-type targets	CERN	30 Apr 2023		Pending
WP2	D7	HighPower C-WAVE with customized linewidth option	HUB	31 Jul 2023		Pending
WP3	D8	Application of fast scanning option for multi actinide detection	LUH IRS	31 Oct 2021	19 Mar 2022	Approved
WP3	D9	Optimized production scheme for 225Ac	KUL	30 Apr 2022		Pending
WP3	D10	Application of narrowband excitation for 238U / 238Pu discrimination	LUH IRS	30 Apr 2023		Pending
WP4	D11	Calculations of properties of interest of the lighter actinides with relativistic CI+MBPT method	RUG	30 Jun 2021		Pending
WP4	D12	Application of the relativistic coupled and CI+MBPT approaches to heavier actinides and superheavy elements	RUG	31 Oct 2022		Pending
WP4	D13	Hyperfine splitting in actinium including radiative corrections	FSU	31 Oct 2022		Pending
WP4	D14	Basic resonance ionization data from Ti:Sa laser spectroscopy for 10 lighter Actinides (scientific report)	JGU	28 Feb 2023		Pending
WP4	D15	Electron affinity measurement of an actinide online at CERN-ISOLDE	UGOT	30 Apr 2023		Pending
WP5	D16	Optimized geometry of the gas cell nozzle	KUL	31 Oct 2021	20 Mar 2022	Approved
WP5	D17	Laser ablation source	JYU	31 Oct 2021		Pending
WP5	D18	Off-line U studies (scientific report)	JYU	30 Apr 2022	17 May 2022	Submitted
WP5	D19	Preparation and characterization of samples for LISA	JGU	31 Oct 2022		Pending
WP5	D20	Precise data of atomic and nuclear properties of Lr	GSI	30 Apr 2023		Pending
WP5	D21	Exotic U studies (off- and on-line production)	JYU	31 Oct 2023		Pending
WP6	D22	Individual career development plans	KUL	31 Aug 2020	04 Apr 2022	Approved
WP6	D23	Enrolment in PhD programs	KUL	31 Dec 2020	04 Apr 2022	Submitted
WP6	D24	Open training events	KUL	31 Dec 2022		Pending
WP6	D25	PhD award	KUL	31 Oct 2023		Pending
WP7	D26	Website	CERN	30 Apr 2020	06 May 2020	Approved
WP7	D27	Promotional material	CERN	30 Nov 2020	08 Jun 2021	Approved
WP7	D28	Public lectures	CERN	31 Jul 2023		Pending
WP8	D1	NEC - Requirement No. 1	CERN	31 Oct 2020	04 Apr 2022	Approved
WP8	D2	EPQ - Requirement No. 2	CERN	31 Oct 2020	04 Apr 2022	Approved

LISA @ CERN-ISOLDE in 2022

★
AC
PI-
LIST

GPS schedule 2022														
March		April					May					June		
12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
21	28	4	11	18	25	#534 Sn VD5 2	9	16	23	30	Pentecost 6	13	20	27
		#756 UC q n	IS685				#734 UC VD7 (TBC)						#758 UC q n	
#627 Ta	IS688 (nights)		#634 LIST					#752 LIST	Ascension "May 1"					
	#734 UC VD7		Good Fri						IS654					
	IS691	IS685		LOI 19 (LOI 217)		IS647 IS652	IS659		LOI 26		IS668 + Colls		IS671 + tests	TAS IS684
RILIS : Dy		RILIS : Dy		RILIS : Cd		111Cd		8He/6He		RILIS: Ac		RILIS: Sn		RILIS: Zn

HRS schedule 2022														
March		April					May					June		
12	13	14	15	16	17	18	19	20	21	22	23	23	24	25
21	#654 UC W 28	4	11	18	25	2	9	16	23	#755 UC n 30	6	6	#752 LIST 13	20
			CRIS			#751 UC VD5								
		#753 UC											LA1	
			Good Fri	#754 UC n			XXX UC						LA1	
	MD + VITO tests		IS700		IS667	TLD (LISA) and/or MD		IS666		IS660			IS4	LOI225
			RILIS : Al	RILIS : Al	RILIS : Te	RILIS : Te		49K		RILIS: Ag	RILIS: Ag	RILIS: Ag	RILIS: Po	RILIS: Po



[Miranda Nichols](#)
ESR 06



[Julius Wessolek](#)
ESR 09



[Mitzi Urquiza](#)
ESR 15



[Mia Au](#)
ESR 03



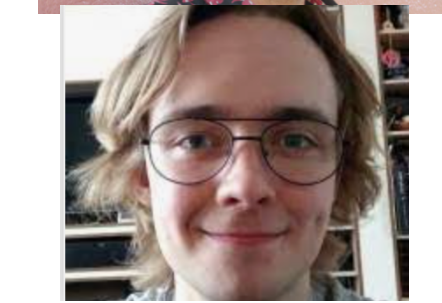
[Magdalena Kaja](#)
ESR 05



[Asar Jaradat](#)
ESR 02



[Jake Johnson](#)
ESR 01



[Fedor Ivandikov](#)
ESR 07

New Recruits!



Asar Jaradat (CERN)



Fedor Ivandikov (KU Leuven)



Joseph Andrews (Univ Jena)

Scientific output is emerging more rapidly...

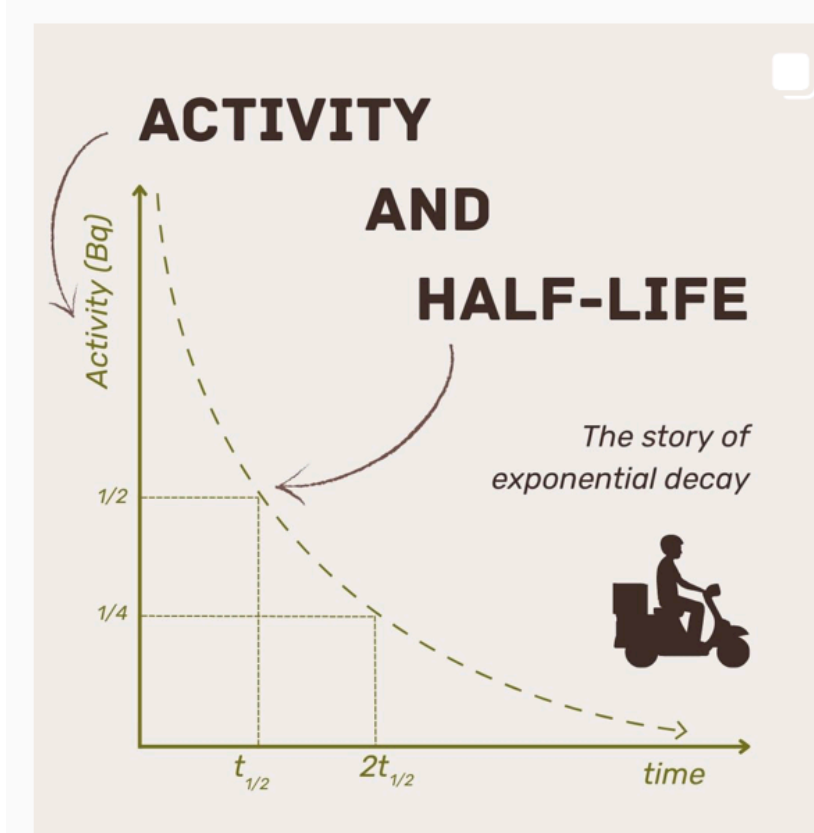
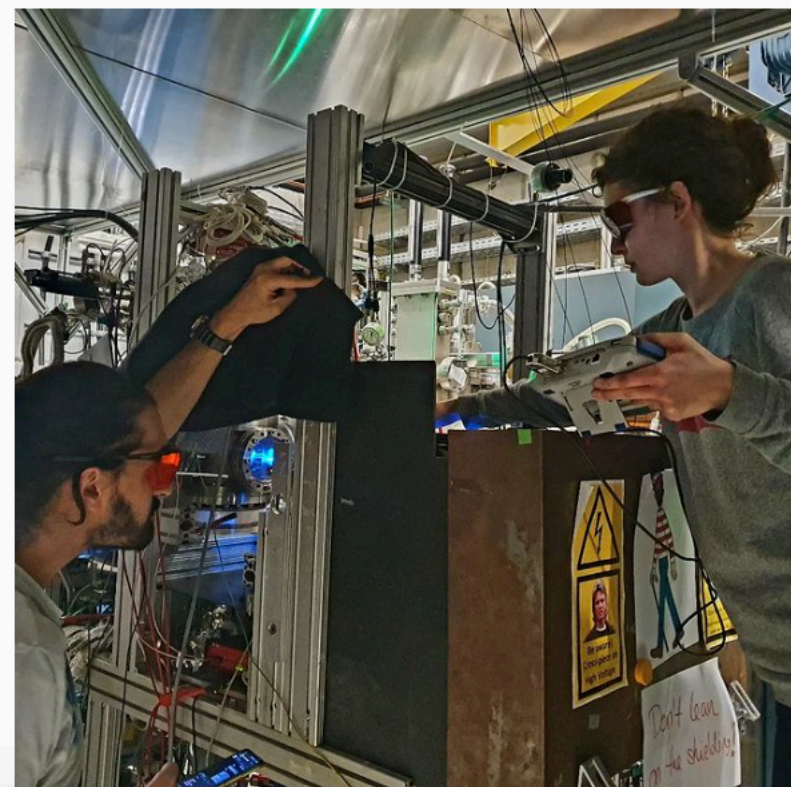
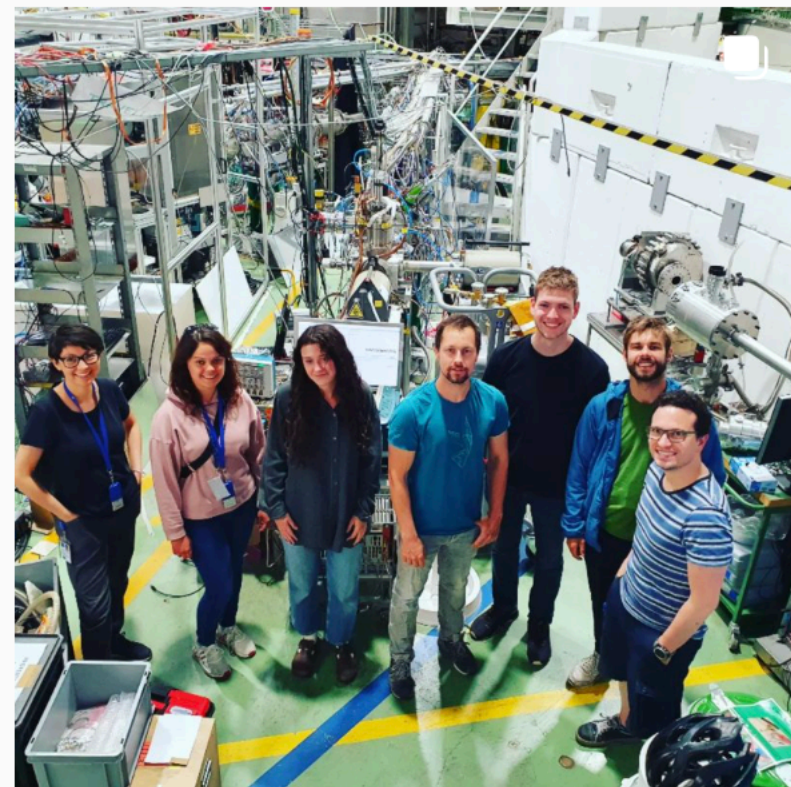
43 submissions only so far
keep them coming..

(inc your talks this week)

Remember to add this:

"This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 861198-LISA-H2020-MSCA-ITN-2019"

Outreach activities..



Any object absorbing ionizing radiation experiences so-called

Dose

measured in energy (in joules) absorbed per kg material, or **Sv**

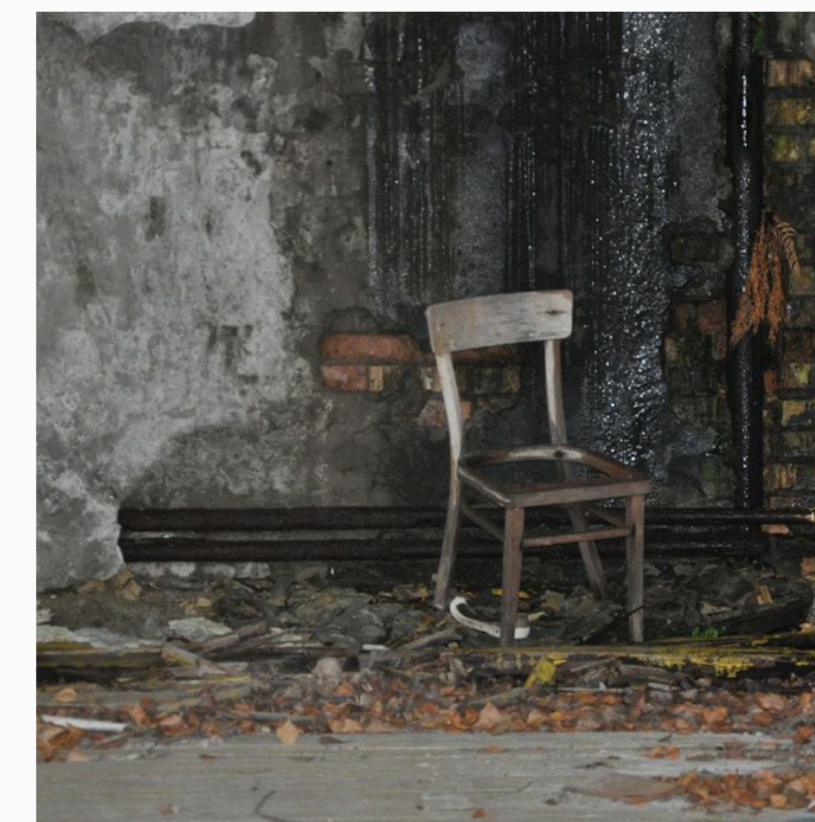
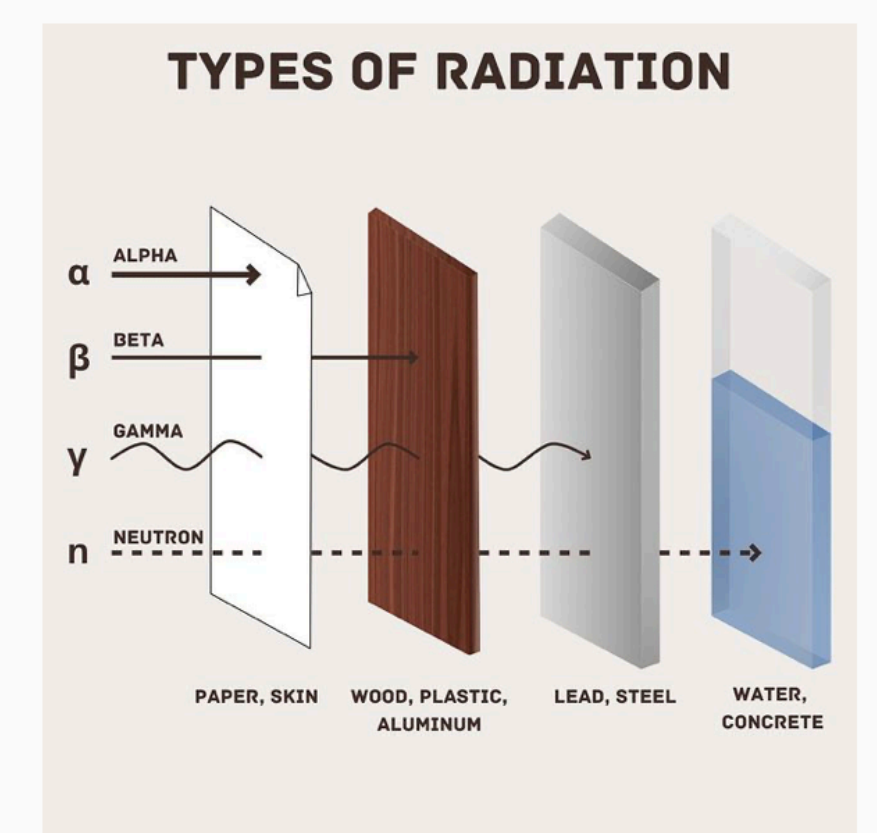

Sievert or sometimes noted as rem (0.1 Sv) or Gray (Dy=5v)

For a human, risk of harm depends on both the dose and **how long** the body is exposed to it. 1 Sv over one hour is far more dangerous than 1 Sv over a lifetime.

That object could be:

- a box
- a fox
- a biological cell
- a fuel cell


But each material is affected differently by radiation

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LISA ITN
L I S A
Laser Ionization and Spectroscopy of Actinides
The Marie Skłodowska-Curie Action #MSCA
Innovative Training Network #ITN
lisa-itn.web.cern.ch



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18 posts 85 followers 0 following

The Exclusion Zone
Radioecology - the study of radioactivity in the environment. By PhD students, for everyone.

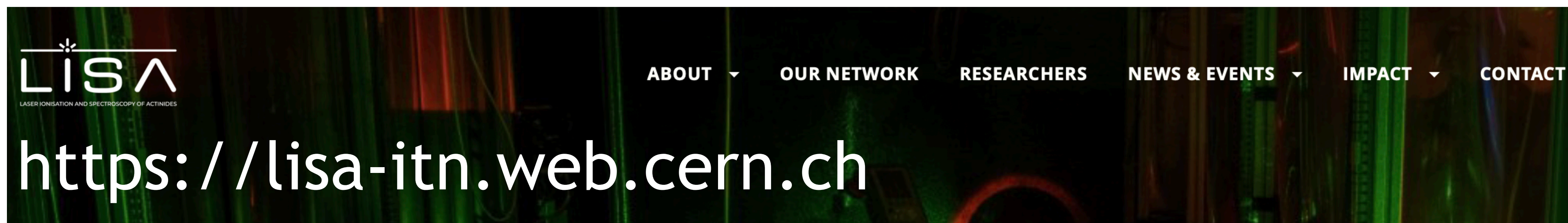
Thanks - and keep up with reporting on the LISA progress!

Scientific output:
Data and publications



<https://zenodo.org/communities/lisa-itn/>

Website:



Social media:



LISA_ITN

