

## Horizon 2020

### Call: H2020-MSCA-IF-2016 (Marie Skłodowska-Curie Individual Fellowships)

### Topic: MSCA-IF-2016

### Type of action: MSCA-IF-EF-ST (Standard EF)

### Proposal number: SEP-210369527

### Proposal acronym: TAcc-NeXB

Deadline Id: H2020-MSCA-IF-2016

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#### How to fill in the forms?

The administrative forms must be filled in for each proposal using the templates available in the submission system. Some data fields in the administrative forms are pre-filled based on the previous steps in the submission wizard.



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Acronym **TAcc-NeXB**

## 1 - General information

Topic MSCA-IF-2016

Call Identifier H2020-MSCA-IF-2016

Type of Action MSCA-IF-EF-ST

Deadline Id H2020-MSCA-IF-2016

Acronym TAcc-NeXB

Proposal title Time variable Accretion onto Neutron Stars in X-ray Binaries

Note that for technical reasons, the following characters are not accepted in the Proposal Title and will be removed: < > " &

Duration in months 24

Scientific Area PHY

Please select up to 5 descriptors (and at least 3) that best characterise the subject of your proposal, in descending order of relevance.

Descriptor 1 High energy and particles astronomy - X-rays, cosmic rays, gamma rays, neutrinos

Descriptor 2 Stars and stellar systems

Descriptor 3 Numerical analysis, simulation, optimisation, modelling tools, data mining

Remove

Descriptor 4 Numerical analysis and scientific computing

Remove

Add

Free keywords

Accretion  
X-ray binaries  
Compact objects  
High Performance Computing  
Magnetohydrodynamics



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## Abstract

*The discovery of the first extrasolar X-ray source in the 60's triggered the rise of High Energy Astrophysics and paved the way to the acceptance of black holes and neutron stars (aka compact objects, CO). The X-ray emission is attributed to the conversion of gravitational energy into heat as gas is accreted onto a CO. The source of matter in X-ray binaries is a star orbiting the CO.*

*Surveys of those systems revealed that this mass transfer displays a broad range of spectral and photometric behaviors with an incredible time variability : sudden bursts which make the system 10,000 times brighter, switches from hard to soft X-ray emission, off-states... all this on time scales from milliseconds to months. This variability can be explained by instabilities within a classic accretion disc around the CO. However, matter is not always expected to slowly spiral in and form a classic disc, especially when the donor star displays fast winds, a fraction of which being captured by the gravitational field of the CO. We aim at highlighting the conditions favorable to the formation of a wind-capture disc, to characterize its structure (permanence, size, thickness...) and to investigate its innermost parts.*

*The complex Physics at stake in those systems has long been beyond our reach due to limited numerical capacities. X-ray binaries are intrinsically intertwined systems which require multi-scales approaches to fully appreciate the turbulent flow, from the Dantean stellar surface down to the magnetic vicinity of the neutron star it feeds. Game changing high performance computing technologies have ushered in a gold rush to design semi-analytical models of X-ray binaries supported by numerical simulations. Once pies in the sky, consistent representations of the accretion process are now within our grasp.*

Remaining characters

180

Has this proposal (or a very similar one) been submitted to a Horizon 2020 Marie Skłodowska-Curie Individual Fellowship call?

☐ Yes ☒ No



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## Declarations

1) The applicant (future beneficiary) declares to have the explicit consent of all partner organisations (if applicable) on their participation and on the content of this proposal.	<input checked="" type="checkbox"/>
2) The information contained in this proposal is correct and complete.	<input checked="" type="checkbox"/>
3) This proposal complies with ethical principles (including the highest standards of research integrity — as set out, for instance, in the <a href="#">European Code of Conduct for Research Integrity</a> — and including, in particular, avoiding fabrication, falsification, plagiarism or other research misconduct).	<input checked="" type="checkbox"/>
4) The applicant (future beneficiary) confirms:	
- to have carried out the self-check of the financial capacity of the organisation on <a href="https://ec.europa.eu/research/participants/portal/desktop/en/organisations/lfv.html">https://ec.europa.eu/research/participants/portal/desktop/en/organisations/lfv.html</a> or to be covered by a financial viability check in an EU project for the last closed financial year. Where the result was “weak” or “insufficient”, the applicant (future beneficiary) confirms being aware of the measures that may be imposed in accordance with the H2020 Grants Manual (Chapter on Financial capacity check); or	<input type="radio"/>
- is exempt from the financial capacity check being a public body including international organisations, higher or secondary education establishment or a legal entity, whose viability is guaranteed by a Member State or associated country, as defined in the H2020 Grants Manual (Chapter on Financial capacity check); or	<input type="radio"/>
- as sole participant in the proposal is exempt from the financial capacity check.	<input checked="" type="radio"/>
5) The applicant (future beneficiary) hereby declares:	
- it is fully eligible in accordance with the criteria set out in the specific call for proposals; and	<input checked="" type="checkbox"/>
- it has the financial and operational capacity to carry out the proposed action.	<input checked="" type="checkbox"/>
The applicant (future beneficiary) is only responsible for the correctness of the information relating to his/her own organisation. Where the proposal to be retained for EU funding, the applicant (future beneficiary) will be required to present a formal declaration in this respect.	

According to Article 131 of the Financial Regulation of 25 October 2012 on the financial rules applicable to the general budget of the Union (Official Journal L 298 of 26.10.2012, p. 1) and Article 145 of its Rules of Application (Official Journal L 362, 31.12.2012, p.1) applicants found guilty of misrepresentation may be subject to administrative and financial penalties under certain conditions.

## Personal data protection

Your reply to the grant application will involve the recording and processing of personal data (such as your name, address and CV), which will be processed pursuant to Regulation (EC) No 45/2001 on the protection of individuals with regard to the processing of personal data by the Community institutions and bodies and on the free movement of such data. Unless indicated otherwise, your replies to the questions in this form and any personal data requested are required to assess your grant application in accordance with the specifications of the call for proposals and will be processed solely for that purpose. Details concerning the processing of your personal data are available on the [privacy statement](#). Applicants may lodge a complaint about the processing of their personal data with the European Data Protection Supervisor at any time.

Your personal data may be registered in the Early Warning System (EWS) only or both in the EWS and Central Exclusion Database (CED) by the Accounting Officer of the Commission, should you be in one of the situations mentioned in:

- the Commission Decision 2008/969 of 16.12.2008 on the Early Warning System (for more information see the [Privacy Statement](#)), or
- the Commission Regulation 2008/1302 of 17.12.2008 on the Central Exclusion Database (for more information see the [Privacy Statement](#)).



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## List of participants

#	Participant Legal Name	Country
1	KATHOLIEKE UNIVERSITEIT LEUVEN	Belgium



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Short name **KU Leuven**

## 2 - Administrative data of participating organisations

### Future Host Institution

PIC	Legal name
999991334	KATHOLIEKE UNIVERSITEIT LEUVEN

*Short name: KU Leuven*

*Address of the organisation*

Street Oude Markt 13

Town LEUVEN

Postcode 3000

Country Belgium

Webpage [www.kuleuven.be](http://www.kuleuven.be)

*Legal Status of your organisation*

#### Research and Innovation legal statuses

Public body .....yes

Non-profit .....yes

International organisation .....no

International organisation of European interest .....no

Secondary or Higher education establishment .....yes

Research organisation .....yes

Small and Medium-sized Enterprises (SMEs) .....no

Academic Sector .....yes

Legal person ..... yes

NACE Code: 853 - Higher education

Does this participant deliver doctoral degrees that are recognised as such by the relevant national authorities?

☒ Yes ☐ No



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Short name **KU Leuven**

### Department(s) carrying out the proposed work

#### Department 1

Department name

☐ not applicable

☐ Same as organisation address

Street

Town

Postcode

Country

If the location of the Department carrying out the proposed work is not the same as the location of the Host Institute, please note that although the proposal submission system calculates the budget of the project based on the location of the Host Institute, the budget of the project for the grant agreement will be calculated by using the country coefficient of the location of the Department carrying out the proposed work.



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Short name **KU Leuven**

## Researcher

The name and e-mail of the Researcher and Supervisor are read-only in the administrative form, only additional details can be edited here. To give access rights and contact details of contact persons, please go back to Step 4 of the submission wizard and save the changes.

Researcher ID	<i>If you have a researcher identifier number (e.g. ResearcherID, ORCID) please enter it here.</i>		
Last Name*	EL MELLAH	Last Name at Birth	
First Name(s)*	Ileyk	Gender*	<input checked="" type="radio"/> Male <input type="radio"/> Female
Title	Mr.	Country of residence*	France
Nationality*	France	Nationality 2	
Date of Birth (DD/MM/YYYY)	05/04/1989	Country of Birth*	France
		Place of Birth	MEAUX (77)

## Contact address

Current organisation name	Paris 7 Diderot University		
Current Department/Faculty/Institute/ Laboratory name	AstroParticule and Cosmology laboratory		
	<input type="checkbox"/> Same as organisation address		
Street	10 Rue Alice Domon et Léonie Duquet		
Postcode/Cedex	75013	Town	PARIS
Phone	+33157276907	Country	France
Phone2 / Mobile	+33678894021		
E-Mail*	ielmhk@gmail.com		





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### Qualifications

University Degree	Date of award (DD/MM/YYYY)	<input type="text" value="01/07/2013"/>
Doctorate (in progress)	Date of award (DD/MM/YYYY)	<input type="text"/>
Doctorate	Date of award (DD/MM/YYYY)	<input type="text" value="07/09/2016"/>
Full time postgraduate research experience	Number of months	<input type="text" value="0"/>
Other Academic qualifications	Date of award (DD/MM/YYYY)	<input type="text"/>

### Place of activity/place of residence (previous 5 years - most recent one first)

Indicate the period(s) and the country/countries in which you have legally resided and/or had your main activity (work, studies, etc) during the last 5 years up until the deadline for the submission of the proposal. Please fill in this section without gaps, until the call deadline (14/09/2016).

Period from	Period to	Duration (days)	Country
16/08/2012	14/09/2016	1491	France
11/09/2011	15/08/2012	340	United States
Total		1831	

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### Supervisor

The name and e-mail of the Researcher and Supervisor are read-only in the administrative form, only additional details can be edited here. To give access rights and contact details of contact persons, please go back to Step 4 of the submission wizard and save the changes.

Title

Prof.

Sex

☒ Male☐ FemaleFirst name\* **Rony**Last name\* **KEPPENS**E-Mail\* **rony.keppens@kuleuven.be**

Position in org.

Division Chair, Centre for mathematical Plasma Astrophysics

Department

Department of Mathematics

☒ Same as organisation address

Street

Oude Markt 13

Town

LEUVEN

Post code

3000

Country

Belgium

Website

<https://perswww.kuleuven.be/~u0016541/>

Phone

+3216327001

Phone 2

+xxx xxxxxxxxx

Fax

+3216327998

### Other contact persons

First Name	Last Name	E-mail	Phone
An	JANSEN	eu-info@kuleuven.be	



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### 3 - Budget

Is the Researcher eligible for family allowance? ☐ Yes ☒ No

Participant Number	Organisation Short Name	Country	Country Coefficient	Number of Months	Researcher Unit Cost			Institutional Unit Cost		Total
					Living Allowance	Mobility Allowance	Family Allowance	Research, training and networking costs	Management and Overheads	
1	KU Leuven	BE	1	24	111600,00	14400,00	0,00	19200,00	15600,00	160800,00
Total				24	111600,00	14400,00	0,00	19200,00	15600,00	160800,00

Partner Organisation from Third Country does not sign the Grant Agreement, does not recruit the researcher and does not directly claim costs from the action. The entire EC contribution is transmitted to the Host organisation located in Members States or Associated Countries.

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## 4 - Ethics issues table

<b>1. HUMAN EMBRYOS/FOETUSES</b>		Page
Does your research involve <a href="#">Human Embryonic Stem Cells (hESCs)</a> ?	<input type="radio"/> Yes <input checked="" type="radio"/> No	
Does your research involve the use of human embryos?	<input type="radio"/> Yes <input checked="" type="radio"/> No	
Does your research involve the use of human foetal tissues / cells?	<input type="radio"/> Yes <input checked="" type="radio"/> No	
<b>2. HUMANS</b>		Page
Does your research involve human participants?	<input type="radio"/> Yes <input checked="" type="radio"/> No	
Does your research involve physical interventions on the study participants?	<input type="radio"/> Yes <input checked="" type="radio"/> No	
<b>3. HUMAN CELLS / TISSUES</b>		Page
Does your research involve human cells or tissues (other than from Human Embryos/ Foetuses, i.e. section 1)?	<input type="radio"/> Yes <input checked="" type="radio"/> No	
<b>4. PERSONAL DATA</b>		Page
Does your research involve personal data collection and/or processing?	<input type="radio"/> Yes <input checked="" type="radio"/> No	
Does your research involve further processing of previously collected personal data (secondary use)?	<input type="radio"/> Yes <input checked="" type="radio"/> No	
<b>5. ANIMALS</b>		Page
Does your research involve animals?	<input type="radio"/> Yes <input checked="" type="radio"/> No	
<b>6. THIRD COUNTRIES</b>		Page
In case non-EU countries are involved, do the research related activities undertaken in these countries raise potential ethics issues?	<input type="radio"/> Yes <input checked="" type="radio"/> No	
Do you plan to use local resources (e.g. animal and/or human tissue samples, genetic material, live animals, human remains, materials of historical value, endangered fauna or flora samples, etc.)?	<input type="radio"/> Yes <input checked="" type="radio"/> No	
Do you plan to import any material - including personal data - from non-EU countries into the EU?	<input type="radio"/> Yes <input checked="" type="radio"/> No	
Do you plan to export any material - including personal data - from the EU to non-EU countries?	<input type="radio"/> Yes <input checked="" type="radio"/> No	
In case your research involves <a href="#">low and/or lower middle income countries</a> , are any benefits-sharing actions planned?	<input type="radio"/> Yes <input checked="" type="radio"/> No	
Could the situation in the country put the individuals taking part in the research at risk?	<input type="radio"/> Yes <input checked="" type="radio"/> No	



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<b>7. ENVIRONMENT &amp; HEALTH and SAFETY</b>		Page
Does your research involve the use of elements that may cause harm to the environment, to animals or plants?	<input type="radio"/> Yes <input checked="" type="radio"/> No	
Does your research deal with endangered fauna and/or flora and/or protected areas?	<input type="radio"/> Yes <input checked="" type="radio"/> No	
Does your research involve the use of elements that may cause harm to humans, including research staff?	<input type="radio"/> Yes <input checked="" type="radio"/> No	
<b>8. DUAL USE</b>		Page
Does your research involve dual-use items in the sense of Regulation 428/2009, or other items for which an authorisation is required?	<input type="radio"/> Yes <input checked="" type="radio"/> No	
<b>9. EXCLUSIVE FOCUS ON CIVIL APPLICATIONS</b>		Page
Could your research raise concerns regarding the exclusive focus on civil applications?	<input type="radio"/> Yes <input checked="" type="radio"/> No	
<b>10. MISUSE</b>		Page
Does your research have the potential for misuse of research results?	<input type="radio"/> Yes <input checked="" type="radio"/> No	
<b>11. OTHER ETHICS ISSUES</b>		Page
Are there any other ethics issues that should be taken into consideration? Please specify	<input type="radio"/> Yes <input checked="" type="radio"/> No	

I confirm that I have taken into account all ethics issues described above and that, if any ethics issues apply, I will complete the ethics self-assessment and attach the required documents. ☒

[How to Complete your Ethics Self-Assessment](#)



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## 5 - Call specific questions

### *Eligibility Researcher (future fellow)*

1. Were you in the last 5 years in military service?

☐ Yes ☒ No

### *Other Questions*

For communication purposes only, the REA asks for permission to publish the name of the researcher (future fellow) should the proposal be retained for funding.

1. Does the researcher (future fellow) give this permission?

☒ Yes ☐ No

2. Is there a secondment in Member States or Associated Countries envisaged in Part B of this proposal?

☐ Yes ☒ No



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### Data management activities

A new focus within Horizon 2020 is data management, for example through the use of [Data Management Plan \(DMP\)](#).

DMPs detail what data the project will generate, whether and how it will be exploited or made accessible for verification and re-use, and how it will be curated and preserved.

The use of a DMP is required for projects participating in the Open Research Data Pilot in the form of a deliverable in the first 6 months of the project (possible updates during the project).

Other projects are invited to submit a DMP if relevant for their planned research.

Are data management activities relevant for your proposed project?	<input checked="" type="radio"/> Yes <input type="radio"/> No
A Data Management Plan will be delivered (Please note: a Data Management Plan (DMP) is required for projects participating in the Open Research Data Pilot in Horizon 2020, in the form of a deliverable in the first 6 months of the project. All other projects may deliver a DMP on a voluntary basis, if relevant for their research).	<input type="checkbox"/>
Data Management is part of a Work Package.	<input type="checkbox"/>
Data Management will be integrated in another way.	<input checked="" type="checkbox"/>
Please indicate how data management will be addressed in your project:	
<div>After having ran simulations on the supercomputers we have access to (CINES, Jülich), the output (a few Tb, saved in a standard XML format), will be stored on local clusters (KU Leuven) and made available on demand for review and scientific purposes for at least 10 years.</div>	
Remaining characters	27

### Open Research Data Pilot in Horizon 2020

All applicants can participate in the [Pilot on Open Research Data in Horizon 2020](#)<sup>1</sup> on a voluntary basis. This Pilot aims to improve and maximise access to and re-use of research data generated by actions.

Participants in the Pilot will be invited to formulate a Data Management Plan (DMP). DMPs detail what data the project will generate, whether and how it will be exploited or made accessible for verification and re-use, and how it will be curated and preserved.

Participating in the Pilot is flexible in the sense that it does not mean that all research data needs to be open. Rather, projects can define certain datasets to remain closed via a Data Management Plan (DMP).

Please note that participation in this Pilot does not constitute part of the evaluation process. Proposals will not be evaluated favourably because they participate in the Pilot on a voluntary basis.

We wish to participate in the [Pilot on Open Research Data in Horizon 2020](#) on a voluntary basis ☐ Yes ☒ No

<sup>1</sup> According to article 43.2 of Regulation (EU) No 1290/2013 of the European Parliament and of the Council, of 11 December 2013, laying down the rules for participation and dissemination in "Horizon 2020 - the Framework Programme for Research and Innovation (2014-2020)" and repealing Regulation (EC) No 1906/2006.