

STudent REseArch Mobility Programme (STREAM) Project proposal



Host University:
Université Paris-Sud

Field (drop-down list):
Natural sciences, mathematics and statistics

Specified field, subject:
Physics, Astrophysics

Research project title:
High-Redshift Galaxy Clusters: data, models, predictions for JWST and Euclid.

Possible starting month(s):

Sep	Oct	Nov	Dec	Jan	Fev	Mar	Apr	May	Jun	Jul	Aug
				X	X	X	X				

Possible duration in months:

1	2	3	4	5	6	7	8	9	10	11	12
		X	X	X	X	X	X				

Alternatively, exact starting and end date: from whatever date to July 1st at the latest.

Suitable for students in: Bachelor level Master level

Prerequisites:
Astrophysics, computer (python)

Restrictions:

Description (maximum 2,000 characters):

How have formed the most massive structures in the universe (galaxi clusters, galaxies)? What is the link between dark matter, baryonic matter and star formation in these structures? How were the first galaxy clusters formed their first generations of stars?

We used the Planck data to look for signatures of redshift $z > 2$ clusters in the far-infrared background fluctuations (cold spots). More than 2,000 candidates were found, and 230 were followed and confirmed by Herschel (including a subsample of 80 by Spitzer and other ground-based facilities). These clusters candidates or proto-clusters of galaxies at $z \sim 2$ are being spectroscopically followed-up.

The internship project is 1) to analyze our ground-based data obtained in near infrared and combined with satellite data Spitzer to better measure the spectral energy distribution of galaxies (with the help of a PhD student) and 2) to model the spectral energy distributions of our sources as well as from the literature (esp. Wang et al., 2016) to make predictions on the observability of these structures with JWST and Euclid, and then develop a realistic observational strategy.



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Faculty and/or Department:

UFR de Sciences, Département de Physique

<http://www.sciences.u-psud.fr>**Contact person, including position:**

Séverine Fogel, Head of International Relations

Contact email:

severine.fogel@u-psud.fr

Deadline for nomination to reach host university:

2 months before the starting date

Notification of admission given by the end of:

Within 3 weeks

Additional information:

Project will take place at the Institut d'Astrophysique Spatiale laboratory (IAS, or institute for space astrophysics, web: <https://www.ias.u-psud.fr/en/>) in the Matière Interstellaire et Cosmology (MIC) team (cosmology and interstellar medium). Our team is internationally known as the leader of Planck HFI, as well as having strong involvements in Spitzer, Herschel and Euclid science. Our team regularly works with colleagues worldwide as ESA or NASA partners.

Earlier parts of our project have been highlighted by an ESA and NASA press releases:

- <http://sci.esa.int/herschel/55705-herschel-and-planck-find-missing-clue-to-galaxy-cluster-formation/>
- <http://www.nasa.gov/jpl/herschel/planck/a-gold-mine-of-galaxy-nuggets>

Our main publication on this topic is: <http://de.arxiv.org/abs/1503.08773>



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