

## Research engineer specialised in "cold atoms"

### > Entity/Service :

- **Open to: External**
- **Contract duration: 1 year**
- **Catégorie : Research engineer**
- **Lieu campus : INPHYNI, Campus Plaine du Var**
- **Adresse : 17 rue Julien Lauprêtre**
- **Référence de l'annonce: 2023-IR-INPHYNI**

### Job description:

Do you have an experience with cold atoms (experimental and/or theoretical)? We're looking for our future research engineer!

For this job, you will work in the "cold atoms" group (supervised by Robin Kaiser), on a Rb cold atom experiment led by Mathilde Hugbart.

#### **Project :**

A cloud of cold atoms coupled to photons is a promising platform for quantum information, computation and communication: atoms are systems for storing and/or correlating photons, while photons enable information to be transmitted efficiently over large distances. In our project, we are focusing on a specific tool for quantum information: correlated photon sources, exploiting the collective and multimode quantum states of ensembles of atoms. The main scientific objective of this project is to explore a new type of correlated photon source based on a multi-atom ensemble.

As a first step, we want to observe a quantum signature in the light scattered by a large number of atoms. This signature will be studied by measuring correlations in the intensity of the light scattered by our cloud of cold atoms, a technique that has already shown its strengths in the study of light-matter interaction, for example through the observation of single or multiple scattering effects. This part is essentially experimental, but numerical studies may also be carried out. This work will also be carried out in collaboration with Arno Rauschenbeutel's group at the University of Berlin.

This project is funded by the Idex 2023 Advanced Research program of the Université Côte d'Azur and by the ANR (International funding (France-Brazil) "Cold atoms, photons, and quantum correlations" (QuaCor, ANR19-CE47-0014-01)).

#### **Your main tasks will be:**

- Running the experiment
- Setting up the tools and/or experimental configurations for observing quantum signatures in the light scattered by the cloud of cold atoms
- Taking data from the experiment and processing it
- Modelling to interpret the data
- Writing articles to publish the results

## Required profile:

### Skills:

- Knowledge of optical and atomic physics experiments
- A strong experience on cold atom experiments are essential
- Experience in numerical scientific computing (MATLAB, Python,...)
- Languages: French or English

### Qualities:

- Serious and motivated, good communication skills and ability to work independently

## Required diploma required and/or experience:

PhD thesis

## Specificity

Start: 01/02/2024 at the earliest

Salary depending on experience: typically 3200 euros brut per month

## Description of the host entity/department

**“Cold atoms group” INPHYNI, Nice, France :** Wave propagation in diffusive media is an important subject for numerous fields (medical imaging, acoustics, seismology, stellar physics, ...). The experiments that we pursue make use of an original medium: a laser-cooled atomic cloud. The peculiar properties of this diffusive medium (strong resonances, strong nonlinearity, quantum internal structure of the scatterers, mechanical effects of light on the atoms, quantum effects...) give rise to a very rich physics. We study several subjects in this context. More generally, we are interested in collective effects in light-atom interaction, which include multiple scattering of light but also nonlinear optics or cooperative scattering.

Finally, we have been involved in a fruitful collaboration with astrophysicists on the measurement of light correlations (Hanbury Brown and Twiss technique). Our work is mainly experimental, using four cold-atom apparatus and several smaller hot-vapor setups, but also theoretical, in particular through many collaborations.

**Côte d'Azur University:** Open to Europe and the world, the Université Côte d'Azur coordinates the higher education and research players on the Côte d'Azur, to offer a very high standard of education, research and innovation. As part of a major transformation of its role and organisation, the Côte d'Azur is also a key player in the European economy. It is also a key player in the dynamics of its local environment, known for the exceptional quality of life it offers its inhabitants, between the sea and the mountains. In this context, the Université Côte d'Azur presents itself as a university of excellence, with humanist values, socially committed and ethically responsible.

## How to apply

Applications, including a CV and recommendation letters, should be sent by e-mail to: Mathilde Hugbart [mathilde.hugbart@univ-cotedazur.fr](mailto:mathilde.hugbart@univ-cotedazur.fr)

and copy to [recrutement@univ-cotedazur.fr](mailto:recrutement@univ-cotedazur.fr)

Merci de bien vouloir notifier la référence 2023- ..... dans l'objet de votre mail.

Please quote reference 2023-IR-INPHYNI in the subject line of your email.

## UNIVERSITÉ CÔTE D'AZUR

Ouverte sur l'Europe et le monde, Université Côte d'Azur coordonne les acteurs de l'enseignement supérieur et de la recherche de la Côte d'Azur, pour offrir un environnement de formation, de recherche et d'innovation de très haut niveau. Inscrite dans une trajectoire de profonde transformation de son rôle et de son organisation, c'est aussi un établissement acteur de la dynamique de son environnement territorial, connu pour la qualité de vie exceptionnelle qu'il offre à ses habitants, entre mer et montagne. Dans ce cadre, Université Côte d'Azur se présente comme une université d'excellence, aux valeurs humanistes, socialement engagée, et éthiquement responsable.

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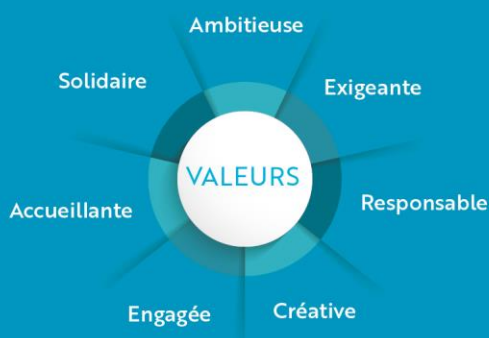
**21** composantes de formation  
dont 8 Ecoles Universitaires  
de Recherche et 6 composantes  
dérogatoires

**60** Laboratoires et  
unités de recherche

**5 432** personnels  
permanents

dont 1809 enseignants/chercheurs,  
1347 administratifs auxquels se rajoutent  
environ 2276 intervenants en formation et  
les collègues chercheurs  
CNRS, INSERM, OCA, INRIA, INRAE...

### > Les valeurs



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