

# Job advertisement

Vacancy ID: 103/2022

Closing date: 15 April 2022



**FRIEDRICH-SCHILLER-  
UNIVERSITÄT  
JENA**

Friedrich Schiller University is a traditional university with a strong research profile rooted in the heart of Germany. As a university covering all disciplines, it offers a wide range of subjects. Its research is focused on the areas Light–Life–Liberty. It is closely networked with non-research institutions, research companies and renowned cultural institutions. With around 18,000 students and more than 8,600 employees, the university plays a major role in shaping Jena's character as a cosmopolitan and future-oriented city.

The Institute of Applied Physics seeks to fill the position of a

## **Scientific employee (Postdoc or PhD position) (m/f/d)** in the research topic **"LiNbO<sub>3</sub>-based nonlinear integrated optics for quantum applications"**

commencing immediately.

We offer a limited full-time postdoctoral position (40 hours/week) or a part-time doctoral position (75%, 30 hours/week), (initially) limited until 31<sup>st</sup> December 2024, with the possibility of an extension if appropriate.

The Institute of Applied Physics (IAP) focuses on basic and applied research in the fields of micro- and nano optics, fiber- and waveguide optics, ultrafast optics, quantum optics and optics ([www.iap.uni-jena.de](http://www.iap.uni-jena.de)).

*Research theme: The current state of the art in large-scale integrated quantum photonics is defined by silicon waveguides. However, this material has several drawbacks related to inherent properties of silicon as an optical material (transparency only in the infrared, weak third-order nonlinearity, spurious Raman nonlinearities, ...).*

*A very promising – but still new – alternative material for integrated quantum photonics is lithium niobate (LiNbO<sub>3</sub>). It combines the advantages of a high-refractive index material (like in silicon photonics) with a set of properties especially advantageous for quantum applications. These include a large transparency in a broad spectral range from  $\lambda=0.4\mu\text{m}$  to  $4.5\mu\text{m}$ , a strong second-order nonlinearity, the potential to use a fast electro-optic modulation, the ability for quasi-phase matching by electric-field poling to enable efficient frequency conversion, and the potential to become a stable laser host material when doped e.g. with Nd- or Er-ions. The material became even more attractive due to the just recently established availability of substrate configurations in the form of lithium-niobate-on-insulator (LNOI), a thin mono-crystalline LiNbO<sub>3</sub>-slab on a low index SiO<sub>2</sub> layer, which substantially eases the realization of optical waveguides. Therefore, LNOI has the potential to not only replicate the results obtained with silicon, but to improve on them resulting in faster and more energy-efficient quantum-photon devices.*

### **Your responsibilities:**

- Work on your doctorate with the specific targets:
  - establishing a comprehensive technology for the realization of high-quality LNOI waveguides,
  - combination of the waveguide technology with methods such as periodic poling or electro-optic modulation,
  - development of novel integrated functionalities, e.g. for polarization control,
  - realization of specific integrated quantum chips, demonstrating e.g. a Hong-Ou-Mandel-type interference experiment or the generation of entangled two-photon states



### Your profile

- University degree in physics, photonics, materials science, mechanical engineering or related subject
- Good understanding of physical and quantum-optics
- Experiences in micro-fabrication of optical components are a plus
- Ability to work both, independently and cooperatively with others as well as an open communication, is highly desirable
- Very good communication skills in written and spoken English would be desirable

### We offer:

- Remuneration based on the provisions of the Collective Agreement for the Public Sector of the Federal States (TV-L) at salary scale E13 – depending on the candidate's personal qualifications—, including a special annual payment in accordance with the collective agreement.
- The possibility to do a PhD with support of the largest A Graduate Academy for doctoral candidates and postdocs
- Participation in experimental and theoretical research project with a strong multi-disciplinary nature within in national and international networks of research institutes and industrial companies
- Excellent equipment and infrastructure
- Participation in international conferences and further education programmes
- A family-friendly working environment with a variety of offers for families, University health promotion and sports activities, as well as attractive fringe benefits (benefits for public transport, capital formation and pension)

The position is limited with the possibility of an extension if appropriate.

This is a full-time position (40 hours per week) for postdocs or a part-time position with 75% of the working hours of a full-time employee (30 hours per week) for PhD candidates.

Candidates with severe disabilities will be given preference in the case of equal qualifications and suitability.

Are you eager to work for us? Then submit your detailed written application, preferably by email (one PDF file), stating the vacancy ID 103/2022 to:

**Friedrich Schiller Universität Jena**  
**Institut für Angewandte Physik**  
**apl. Prof. Dr. Uwe Zeitner**  
**Albert-Einstein-Straße 15**  
**07745 Jena, Germany**

or by email to: [uwe-zeitner@iof.fraunhofer.de](mailto:uwe-zeitner@iof.fraunhofer.de)

Since all application documents will be duly destroyed after the recruitment process, we ask you to submit only copies of your documents.

For further information for applicants, please also refer to [www4.uni-jena.de/stellenmarkt\\_hinweis.html](http://www4.uni-jena.de/stellenmarkt_hinweis.html) (in German)  
Please also note the information on the collection of personal data at [www4.uni-jena.de/en/jobs\\_information\\_collecting\\_personal\\_data.html](http://www4.uni-jena.de/en/jobs_information_collecting_personal_data.html)