Early-Stage Researcher 3-year PhD position: “Efficient intra-cavity and extra-cavity generation of beams with radial and azimuthal polarization in high-power thin-disk lasers”

GREAT - “Grating Reflectors Enabled laser Applications and Training”

ORGANISATION/COMPANY: Institutions across Europe in the GREAT ITN network
RESEARCH FIELD: Physics > Optics > Laser applications, Optical engineering, Metrology and measurement
RESEARCHER PROFILE: First Stage Researcher (R1)
APPLICATION DEADLINE: EXTENDED: 29/02/2020 00:00 - CEST
LOCATION: Germany › Stuttgart › University of Stuttgart › Institut für Strahlwerkzeuge (IFSW)
TYPE OF CONTRACT: Temporary
JOB STATUS: Full-time
HOURS PER WEEK: 35-40
OFFER STARTING DATE: Immediately
EU RESEARCH FRAMEWORK PROGRAMME: H2020 / Marie Skłodowska-Curie Actions
MARIE CURIE (MSCA-ITN-ETN)
GRANT AGREEMENT NUMBER: 813159

We are pleased to advertise an Early-Stage Researcher (PhD) position, as part of the Innovative Training Network of the European Commission GREAT “Grating Reflectors Enabled laser Applications and Training”. The position will all last three years, and will allow all students to participate in an exciting programme comprising international schools, workshops, and secondments at academic as well as industrial partners.

Overview of the project and of the training offered to all Early Stage Researchers of GREAT

The overall aim of the GREAT (Grating Reflectors Enabled laser Applications and Training) project is to train a cohort of 15 Early-Stage Researcher (ESRs) through the completion of interconnected individual projects which will deliver innovative approaches for development and use of Grating Waveguide Structures (GWS), from design to implementation in several laser systems. GWS results from the combination of sub-wavelength gratings and planar waveguides. This combination results, by means
of an appropriate design of the overall GWS resonances, which are more efficient than current grating-only devices, unique optical components that are enabling for a range of applications. The GREAT projects encompass Photonics, Micro-Nano technologies, Advanced Materials as well as Nanotechnologies, which are among the Key Technologies defined within the H2020 framework, underpinning the competitiveness and renewal of European manufacturing. Moreover, Lasers, is identified as an important industrial sector, where the European Community is a key player, who aims to keep its competitive position (http://www.strategies-u.com/lasers-photonics.html).

The ESRs will be embedded within leading international institutions and trained to work collaboratively to deliver ground-breaking research solutions and novel systems, whilst responding to real-world problems. This is a crucial skill, particularly since there is an overall lack of qualified specialized personnel in this field, with a growing number of active companies worldwide. Critically, this lack of skilled workforce has been identified by the ETP Photonics21 (Photonics21 (2013), “Towards 2020 – Photonics driving economic growth in Europe-Multiannual Strategic Roadmap 2014 – 2020”), as a major challenge for the photonics community, but also highlighting a rich landscape for career progression.

Therefore, the GREAT network will provide each ESR with key learning opportunities along with project specific exposure to important modelling methods, world-leading fabrication tools, or systems development. These will be paramount for the realization of optics based upon GWS, leading to the consolidation and expansion of their use in several advanced application-themes in the field of Laser, such as pulse compression, spectral stabilization and wavelength multiplexing, as well as polarization shaping (generation of beams with radial and azimuthal polarization).

**Job description**

**Efficient intra-cavity and extra-cavity generation of beams radial and azimuthal polarization in high-power thin-disk lasers**

Accomplishment of implementation and qualification of highly efficient grating waveguide structures developed within GREAT for the generation of CW beams with radial and azimuthal polarization in high-power thin-disk lasers at an average power higher than 1 kW with high optical efficiency (> 50 %). Implementation of GWS for the generation of beams with radial/azimuthal polarization in modelocked thin-disk lasers (> 50 W). Accomplishment of demonstration of power capability of the developed GWS within the experimental investigations. Thermal analysis of the GWS at high-average power. Implementation of GWS as extra-cavity polarization converter in the beam path of CW, ps, and fs lasers.

**Specific requirements:** Basic experiences in handling of optics, fundamentals in laser physics.

**Additional information**

The successful candidates will receive a 36 month, full-time employment contract as per Marie Skłodowska-Curie Actions (MSCA) regulations for early stage researchers. The monthly salary will be confirmed upon offer, paid in the currency of the host country, and with a correction factor applied to the host country. The approximate monthly salary before employer and statutory deductions is €3,172 plus an additional mobility allowance of €600/month. Researchers may also qualify for a family allowance of €500/month depending on family situation at the time of recruitment. Please visit the EU MSCA website for further information.

The ESRs will be enrolled in an exciting PhD programme of leading academic and industrial researchers. In addition to their individual scientific projects, all ESRs will benefit from a dedicated training program comprising an integrated curriculum of local and intensive network courses, schools, workshops and engagement with cutting-edge research.
Eligibility criteria

There are strict eligibility requirements within Marie Skłodowska-Curie Innovative Training Networks. At the time of appointment, applicants must not have resided or carried out their main activity (work, studies) in the country for more than 12 months in the 3 years immediately before their appointment; AND shall also be in the first four years of their research careers at the time of appointment and have not been awarded a doctoral degree.

Offer Requirements, Skills and Qualifications

- Must have Master (or equivalent) degree in Mechanical Engineering, Mathematics, Physics or Photonics with solid knowledge of optics and its applications.
- Must be in the first 4 years of his/her career, measured from the date of graduation (MSc degree or equivalent).
- Should not hold a PhD degree.
- Should not have resided or carried out their main activity (work, studies) in the country of their appointment for more than 12 months in the 3 years immediately before their appointment. For refugees under the Geneva Convention, the refugee procedure (i.e. before refugee status is conferred) will not be counted as ‘period of residence/activity in the country of the beneficiary’.
- Must be able to communicate fluently in English, in oral and written form.

Selection process

Applicants will need to submit for each application:

- Brief description of why the applicant wishes to become a PhD student within GREAT (Letter of motivation).
- Copy of transcripts and of their degree, and a copy of master's thesis and any other publications (if available).
- Curriculum vitae of three pages maximum.
- Two written recommendation letters (e.g. one by the former Master thesis supervisor and their referees contact details).

[PLEASE SEND YOUR FULL APPLICATIONS TO THE FOLLOWING E-MAIL ADDRESS: great@ifsw.uni-stuttgart.de]

Only complete applications will be considered.