

The Leibniz-Institut für Kristallzüchtung (IKZ) is a leading research institution in the area of science & technology as well as service & transfer of crystalline materials. Our goal is to enable solutions for urgent societal challenges (e.g. communication, artificial intelligence, climate protection, health etc.) by modern electronic & photonic technologies. The work covers the full spectrum from basic over applied research up to pre-industrial development and is performed in collaboration with national and international partners from university, academy and industry. The institute is part of the Forschungsverbund Berlin (<https://www.fv-berlin.de/>) and a member of the *Leibniz Association* [www.leibniz-gemeinschaft.de](http://www.leibniz-gemeinschaft.de). You can find more details on the institute webpage: [www.ikz-berlin.de](http://www.ikz-berlin.de).

We are offering a

## PhD Student Position (m/f/d)

for the topic:

### „Growth and processing of ultra-high purity germanium single crystals for radiation detectors“

High-purity germanium (HPGe) single crystals play a key role in radiation detection applications. They excel in gamma-ray spectroscopy,  $0\nu\beta\beta$ -decay, low-mass dark matter search, and offering excellent energy resolution with large detector sizes for high radiation detection efficiency. As a partner in the grand international research collaboration LEGEND (Large enriched germanium experiment for neutrinoless- $\beta\beta$ -decay), our research focusses on the synthesis of high-quality and ultra-HPGe single crystals. One of the major challenges in this research is, reducing and controlling the unintentional impurities (P, B, Al, etc.) to reach the required purity level, usually a net charge carrier density  $< 10^{10} \text{ cm}^{-3}$  (i.e. impurities below ppt level). Ascertaining and quantifying the ultra-low concentrations of impurities is another challenge. Furthermore, formation of point defects in the crystals, especially, the vacancy-hydrogen acceptor complexes ( $V_2H$ ) are detrimental for detector applications and should be eliminated by understanding the underlying mechanism of defect formation. These problems are to be addressed by finding new approaches and innovative process optimisation both in zone purification and crystal growth processes. A brand new, dedicated lab facility is available at IKZ and you will work along with most experienced semiconductor researchers, where your independent thinking is supported and novel ideas are particularly encouraged. Did we enlighten and wake up your interest for synthesizing Ge crystals with such low impurity levels that these are among the purest materials on earth?

The tasks as a PhD student in this international consortium will include,

- Czochralski growth of HPGe crystals and characterisation
- Zone purification and materials processing
- Identification and quantification of “ultra-low level” impurities using various measurement techniques (like PTIS, AMS, ICPMS)
- Fabrication and characterization of HPGe detectors
- Investigations of crystalline defects on the detector performance

#### Qualifications:

Applicants must hold a master degree in either physics, materials science, chemistry or other related disciplines

Prior hands-on experience or skills in the following fields is an asset to your application:

- Crystal growth from melt, specifically in Czochralski, zone refining techniques is a plus
- Strong background in semiconductor physics and materials processing
- Programming/Software skills (Matlab, C, Origin)
- Good English language skills - written and oral
- Basic knowledge in German language is advantageous

**What we offer:**

The position is limited to three years. Payment is according to TVöD Bund (75 %) (Treaty for German public service). Among equally qualified applicants, preference will be given to disabled candidates. The IKZ is an equal opportunity employer and actively supports reconciliation of work and family life. There is equality for applicants of all genders. Qualified women are especially encouraged to apply.

You enjoy working in a motivated team, and you will gain unique experience in the renowned crystal growth institute and work on potentially ground-breaking technologies for the production of semiconductor materials and its related research. Also, you will appreciate the intimacy of the city of Berlin.

For information about the project please contact: Priv.-Doz. Dr. R. Radhakrishnan Sumathi,

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**Have we aroused your interest?**

Then apply with a letter of motivation, curriculum vitae and all relevant certificates by **15<sup>th</sup> of August**. To do so, please go to [Job offers/jobs](#) on our homepage and click on this advertisement and then on "**Apply online**". Please send us your complete application documents this way.

**We look forward to receiving your application!**