



# Institute of Physics of the Polish Academy of Sciences

## Scholarship for a PhD Student



Job ID: #JOB 34/2022

### Job Description

**Job Title:** PhD student – scholarship holder

**Job Summary:**

**Study of the effect of the nanostructured periodic nanomagnet lattices on magnon-photon coupling**

**Job Description:**

**Background:** Magnons have recently been considered a new candidate for coherent quantum information processing, where magnon-photon interactions can be achieved via magnetic dipoles. Magnons are the collective excitation of spins in magnetic materials. Their frequency range lies from GHz to THz. Magnetic materials can provide much larger coupling strength and cooperativity because they have spin densities four to six orders of magnitude higher than in spin ensembles. This means magnons can exchange information faster and for more cycles before losing coherency while keeping the device dimension small.

**Aim:**

On-chip integration and miniaturization on a nanoscale are required to implement the high spin density magnetic materials into practical quantum devices. To achieve this goal, many fundamental physics and technological issues must be addressed, such as 1) Does the magnon-photon coupling scales as we systematically reduce the dimensions of the magnetic element into the nanoscale regime? 2) Are their critical dimensions of magnetic elements where magnon-photon coupling enhances or reduces? 3) Can we tune the magnon-photon interaction via *periodic* nano structuration?

Requirements:

- Master's degree in physics (or an equivalent that qualifies one for PhD studies in physics in the country of issue).
- To be employed, the candidate must be accepted into the PhD school in which the Institute of Physics participates. Applications for the position are through recruitment to the School, online at [warsaw4phd.eu](http://warsaw4phd.eu).

**Main research field:** Physics

**Sub Research Field:** Nanomagnetism

**Career Stage:** Early stage researcher or 0-4 yrs (Post-graduate)

**Research Profile** ([details](#)): First Stage Researcher (R1)

**Type of Contract:** Fixed term (48 months)

**Status:** Full-time

**Salary:** Scholarship grant funding of 5000 PLN per month, before subtracting obligatory employer and employee social security contributions (~15%), for 36 months. Afterwards, standard Polish PhD scholarship (about 3240 PLN/month net in year 4).

**Contact**

More information can be obtained from

Vinayak Bhat (e-mail: [vbhat@magtop.ifpan.edu.pl](mailto:vbhat@magtop.ifpan.edu.pl))

Please make contact.

## Application details

**Application deadline: 10.08.2022** Later applications will not be considered.

**Required materials:**

- Scientific CV
- Cover letter
- Scan of MsC diploma or equivalent (or an explanation of when one is expected)
- Academic record (for finalized semesters)
- Recommended: A recommendation letter by an academic, or their contact email.

All materials should be submitted in electronic form by application to the PhD school warsaw4phd.eu, choosing the project: *"Study of the effect of the nanostructured periodic nanomagnet lattices on magnon-photon coupling"*. The application system will be active from 27 July 2022.

Results regarding the position will be made available by 19 September 2022.