

# Open MSc position: “Quantum magnetism and quantum computing”

**Topic description:** Magnetism at quantum level exhibits phenomena, which are not present in the classical limit. Although the theory was conceived hundred years ago, only the recent development of measuring techniques has made the respective experiments, to prove some of the predictions, possible. The progress opens up unlimited possibilities for further fundamental investigations as well as for applications. For example, magnetic skyrmions, consisting of a finite number of magnetic moments, are among the candidates for carriers of quantum information- qubits. In order to understand the behavior of such objects, it is necessary to carry out simulations, the computational costs of which grow exponentially with the number of degrees of freedom. A promising solution of this problem is based on quantum computing, for example, in terms of the quantum variations eigensolver (VQE), running either on simulators or on real quantum computers. The candidate will be involved in the development, implementation and application of quantum algorithms to tackle the open questions related to the quantum magnetic skyrmions and similar magnetization patterns.

## **Requirements for candidates:**

- Bachelor's degree in Natural Sciences
- Enrolment in master's study course in Natural Sciences
- Basic knowledge of quantum mechanics
- Basic knowledge of (classical) programming

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Ljubljana, 2.4.2026