$^{25}Mg^{+}$ ions as a platform for quantum computing

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Recently the subject of quantum computing attracts more and more interest of researchers all over the globe. Companies such as IBM, Google, IonQ invest significant amounts of resources in the development of qubit manipulation methods and their optimization, and thus, increasing the performance of quantum operations. One of the candidates for being an effective ion qubit is the $^{25}Mg^{+}$ ion. Having a simple energy level structure, it requires just one laser system for cooling and state preparation. In addition, its mass is relatively small compared to the majority of ion qubits, which can help increase the fidelities of single- and multiqubit gates. In the Physical Institute of Russian Academy of Sciences the possibilities of performing operations on Mg ions are studied. The presentation shows the results achieved by now, as well as plans for further studies. In particular, the technique of ion trapping and cooling is described, and the results of secular frequency scanning are presented.