

SEARCH FOR PARITY VIOLATION USING $^{177,179}\text{HfF}^+$ CATIONS

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Considering the great potential for investigations of T , P -violating effects on HfF^+ ions [1], it was proposed in Ref. [2] to use $^{177}\text{Hf}^{19}\text{F}^+$ and $^{179}\text{Hf}^{19}\text{F}^+$ ions to measure nuclear magnetic quadrupole moment (MQM) of ^{177}Hf and ^{179}Hf nuclei which have spins $I = 7/2$ and $I = 9/2$ respectively.

The important characteristic of the experiments on HfF^+ is that *rotating* magnetic and electric fields are used to trap ions [1]. In this case, the magnetic field, in contrast to experiments in static fields, is not an auxiliary tool, but should ensure a nonzero energy shift due to possible T , P -odd effects [3]. To completely polarize the molecule and to access the maximum T , P -odd effect both rotating electric and magnetic fields should be large enough. The saturating value of the magnetic field is strongly depends on the considered Zeeman sublevel of the ion. These values are required to plan the experiment and their calculation is the main aim of the work.

To populate the required levels in experiments one needs to know energy levels structure. This problem is especially important for $^{177,179}\text{HfF}^+$ since it has dense spectrum due to high nuclear spins of $^{177,179}\text{Hf}$. Further, the knowledge of g -factors helps to control and suppress systematic effects due to stray magnetic field therefore calculations of these properties in external fields are also made in our work [4].

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