

## Search for a permanent EDM with radioactive atoms

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To explore the mechanism responsible for the generation of observed matter-antimatter asymmetry in the Universe, the experimental study on the violation of the fundamental symmetry using the laser cooled and trapped atoms is being promoted. One such phenomenon of our interest is the intrinsic electric dipole moment (EDM) of either elementary or composite systems. The non-zero observation of EDM provides the direct and conclusive signatures of the violation of time-reversal symmetry and under the CPT invariance it means the CP violation.

In paramagnetic atoms, an electron EDM results in an atomic EDM enhanced by the factor of the 3rd power of the charge of the nucleus due the relativistic effects. A heaviest alkali element francium (Fr), which is the radioactive atom, has the largest enhancement factor  $K \sim 895$ , and other heavy radioactive elements such as Ra and other atoms are also powerful candidates to search for the EDM. In the world, there are many activities to overcome the current accuracy limit of the EDM using different techniques such as the fountain, optical dipole trap, optical lattice and others to reduce the systematic error due to the motional magnetic field and inhomogeneous applied field.

The present status of the EDM search in the world using the radioactive atoms with extreme quantum states at the low-energy scales will be presented.

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