

Atomphysik-Seminar

Dienstag, 24. Oktober, 13:15 Uhr, KBW 2.28

Actinide Highly-Charged Ions for Tests of Fundamental Physics & Predicting Atomic Properties of Superheavy Atoms



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The modern theories directed toward unifying gravitation with the three other fundamental interactions suggest variation of the fundamental constants and violation of Lorentz symmetry. While the energy scale of such physics beyond the Standard Model is much higher than that currently attainable by particle accelerators, both variation of the fundamental constants and Lorentz violation may nevertheless be detectable via precision measurements at low energies. We identify the actinide Cf^{17+} , Cf^{15+} and Es^{16+} ions as the best systems to search for variation of the fine-structure constant α . These ions have all features of the best optical clock transitions leading to possibility of the frequency measurements with fractional accuracy on the level of 10^{-18} or better and have very large enhancements of α -variation effects. We also propose the same ions for tests of Lorentz violation. I will also discuss our work on predicting atomic properties of superheavy elements, including No, Lr, and Rf.