

# ExtreMe Matter Institute EMMI

## EMMI Featured Talk / GSI-FAIR Colloquium

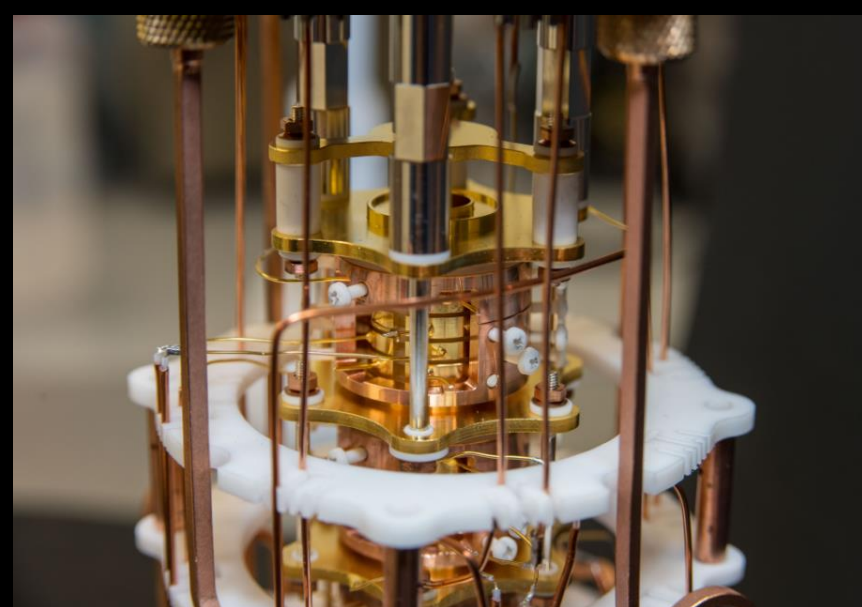
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July 22, 2025, 16:15

Main Lecture Hall SB1, GSI, Darmstadt

### **Precision tests of the Standard Model at low energies using stored exotic ions in Penning traps**



An overview is given on recent mass and  $g$ -factor measurements with extreme precision on single or few cooled ions stored in Penning traps. Among others the most stringent test of bound-state quantum electrodynamics could be performed. Here, the development of a novel technique, based upon the coupling of two ions as an ion crystal, enabled the most precise determination of a  $g$ -factor difference to date. This difference, determined for the isotopes  $^{20,22}\text{Ne}^{9+}$  with a relative precision of  $5.6 \times 10^{-13}$  with respect to the  $g$  factor, improved the precision for isotopic shifts of  $g$  factors by about two orders of magnitude. Our latest results on precision measurements with exotic ions in Penning traps will be presented.