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## Superconducting toroidal resonator at ARTEMIS in HITRAP

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ARTEMIS (AsymmetRic Trap for measurement of Electron Magnetic moment in IonS) is a Penning trap-based experiment at HITRAP in GSI, Darmstadt, which is aiming to measure the  $g$ -factor of heavy, highly charged ions (such as  $U91+$ ) as one of the most stringent tests of quantum electrodynamics. These ions in the magnetic and electric fields of the Penning trap demonstrate a distinctive motion that can be broken down into three individual components. In order to measure the  $g$ -factor of the ions in the trap, a crucial part is to measure the frequencies associated with the charged particle of each of these individual motions independent of each other. This is done using the image current generated across the trap electrodes taking into account the self-capacitance of the trap electrodes. We present the use of an RLC circuit in the form of a toroidal superconducting resonator made of NbTi with a copper housing along with the associated designing principles taking into consideration the operating working conditions of 7T and 10-13 mbar. This is followed by the recent test results of a superconducting toroidal resonator with a  $Q$  factor  $\approx 4500$  at an operating eigenfrequency  $\approx 2.4$  MHz. Further plans include the study of changing designing parameters and their influence on the  $Q$  factor.

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