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Precision high voltage divider for the electron cooler at CRYRING

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The low energy storage ring CRYRING is currently being set up as the first storage ring of the upcoming accelerator facility FAIR at GSI. CRYRING features an electron cooler to cool stored ions and thus achieve a low momentum spread of the beam. To determine the velocity of the ions a precise knowledge of the acceleration voltage of the electron cooler is essential. In earlier measurements of hyperfine transitions in hydrogen- and lithiumlike ions at the Experimental Storage Ring (ESR), the limiting uncertainty was the voltage measurement of the electron cooler. That uncertainty could be removed by an in-situ precision measurement of the cooler voltage using a precision high voltage divider provided by PTB on a temporary basis. Since commercially available high-voltage dividers do not offer the desired precision and stability for use at CRYRING, we construct a high-precision divider for voltages up to 35 kV which will be similar to the ultrahigh-precision voltage dividers which have been constructed in Münster in cooperation with PTB for use at the KATRIN experiment. The precision of the divider will be in the low ppm range and will, if other sources of systematic uncertainties like e.g. space charge effects are under control, allow for measurement uncertainties in the <10 E-5 region. The divider concept, characterization measurements of the precision parts and the status of the project will be presented. This work is supported by BMBF under contract number 05P15PMFAA.

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