

# High-resolution astrophysical applications of the PolarX-EBIT

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For the interpretation of X-ray emission lines of stellar sources in astrophysics, a good knowledge of fundamental atomic parameters of Highly Charged Ions (HCI) is crucial. High resolution observations of the Perseus cluster by the Hitomi satellite mission showed a variety of lines for which atomic databases are incomplete or incorrect. For the upcoming satellite missions, e.g. XRISM and Athena, it is vital to fill these gaps for the most abundant elements in space. For this application we developed a compact electron beam ion trap (EBIT) employing an off-axis gun, leaving the main axis free of any obstacles, which allows to install the EBIT parasitically at high brilliant photon light sources such as synchrotrons for photon plasma interaction investigations. We demonstrate high-precision measurements of dielectronic recombination and resonant photo excitation of Ne- up to He-like systems. Furthermore, we were able to shed a light on an astrophysical puzzle regarding the interstellar atomic oxygen 1s-2p absorption line energy deviating from laboratory measurements, which led to the dubious conclusion that the mean radial velocity of the atomic oxygen in the interstellar medium is 340km/s larger than the galactic escape velocity.