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Ongoing Atomic Physics Research for Fusion Diagnostics at the NIST EBIT[1] YURI PODPALY, JOHN GILLASPY, YURI RALCHENKO, JOSEPH READER, JOHN CURRY, National Institute of Standards and Technology — Passive x-ray spectroscopy on fusion devices uses well-known emission lines for measuring the plasma rotation and ion temperature profile, impurity surveys, and estimating electron temperature and Zeff. These measurements require the use of well-known diagnostic lines from injected impurity elements such as argon and krypton and from intrinsic impurities, particularly tungsten. Electron Beam Ion Traps (EBITs), which use electromagnetic traps with a precise electron beam energy to ionize a known charge state of an atom, are ideally suited to study fusion-relevant impurity ions in a controlled environment and generate wavelengths, relative intensities, and cross-sections. The ongoing work at the NIST EBIT is presented on tokamak-relevant impurities in the x-ray and EUV region including studies of diagnostic elements such as krypton and xenon and intrinsic impurity elements such as tungsten, tantalum, hafnium, and gold.

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