Abstract Submitted
for the DAMOP20 Meeting of
The American Physical Society

X-ray spectroscopy of highly charged Fe plasma with the transition-edge-sensor-based microcalorimeter at the NIST EBIT[1] YANG YANG, ENDRE TAKACS, Clemson University, DIPTI FNU, RALCHENKO YURI, GALEN O'NEIL, PAUL SZYPRYT, JOSEPH N. TAN, AUNG S. NAING, National Institute of Standards and Technology, AMY GALL, NANCY BRICKHOUSE, RANDALL SMITH, ADAM FOSTER, Harvard-Smithsonian Center for Astrophysics — The electron beam ion trap (EBIT) facility at the National Institute of Standards and Technology (NIST) was used to produce x-ray spectra from highly charged ions of Fe with the beam energy varying between 6.6 keV and 18 keV. The spectra were recorded with an array of 192 transition-edge sensor (TES) based x-ray microcalorimeters [1] which covered the broadband energy range roughly from 500 eV to 10000 eV with an energy resolution of about 5 eV over this range. Calibration was performed using Kalpha emission lines from metallic Mg (1.25 keV), Al, Fe, Co and Ni (7.48 keV) produced by an external calibration source. The measured spectra clearly revealed the features due to the stabilizing radiative decays of high n autoionizing states as well as direct excitation lines. The analysis of the measured spectra was performed through the detailed collisional-radiative modeling of the non-Maxwellian plasma using the NOMAD code [2] which reproduced the resonance and excitation features. The interpretation of measurements as well as the details of theoretical simulations will be presented. [1] P. Szypryt et al., Rev. Sci. Instrum. 90, 123107 (2019). [2] Yu. Ralchenko and Y. Maron, J. Quant. Spectr. Rad. Transf. 71, 609 (2001).

[1]

Yang Yang
Clemson University

Date submitted: 31 Jan 2020 Electronic form version 1.4