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Axisymmetric Eigenmodes of Spheroidal Pure Electron Plasmas YOSUKE KAWAI, HARUHIKO SAITOH, ZENSHO YOSHIDA, Graduate School of Frontier Sciences, The University of Tokyo, 5-1-5 Kashiwanoha, Kashiwa, Chiba 277-8561, Japan, YASUHITO KIWAMOTO¹, Graduate school of Human and Environmental Studies, Kyoto University, Yoshidanihonmatsu-cho, Sakyo-ku, Kyoto 606-8501, Japan — The axisymmetric electrostatic eigenmodes of spheroidal pure electron plasmas have been studied experimentally. It is confirmed that the observed spheroidal plasma attains a theoretically expected equilibrium density distribution, with the exception of a low-density halo distribution surrounding the plasma. When the eigenmode frequency observed for the plasma is compared with the frequency predicted by the dispersion relation derived under ideal conditions wherein the temperature is zero and the boundary is located at an infinite distance from the plasma, it is observed that the absolute value of the observed frequency is systematically higher than the theoretical prediction. Experimental examinations and numerical calculations indicate that the upward shift of the eigenmode frequency cannot be accounted for solely by the finite temperature effect, but is significantly affected by image charges induced on the conducting boundary and the resulting distortion of the density profile from the theoretical expectation.

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