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Observation of Non-Uniformity of Space Potential on Magnetic Surfaces in Helical Nonneutral Plasmas HIDENORI WAKABAYASHI, The Graduate University for Advanced Studies, HARUHIKO HIMURA, Kyoto Institute of Technology, MITSUTAKA ISOBE, SHOICHI OKAMURA, KEISUKE MATSUOKA, National Institute for Fusion Sciences — In a series of experiments on the helical non-neutral plasmas, it is observed that the space potential is non-uniform on magnetic surfaces. The electron plasmas are generated by continuous injection of electrons for 40ms into the vacuum magnetic surfaces of the Compact Helical System at NIFS. Electrons are launched out with the acceleration voltage (V_{acc}) from 300V to 1kV. The potential non-uniformity is almost proportional to V_{acc} . Experimental errors such as misalignment of the measurement probe and the perturbing effect of probe insertion are carefully checked, and confirmed not to be the reason of the observed potential variation. By a dimensional analysis of the force balance equation, one can find that the potential variation along the magnetic field line of force can be on the order of the electron temperature T_e . In our experimental situation T_e is not known properly so far. But it is estimated to be a few hundreds of eV, and seems to be consistent with the observed variation of the space potential.

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