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Measurements of the toroidal structure of the ion-driven instability in the CNT stellarator XABIER SARASOLA, THOMAS PEDERSEN, QUINN MARKSTEINER, MICHAEL HAHN, PAUL BRENNER, Columbia University — CNT is a stellarator designed to confine pure electron and other non-neutral plasmas. An instability has been observed in electron-rich non-neutral plasmas when a finite ion fraction is present. The instability has a poloidal mode number of $m=1$. This does not correspond to a rational surface, implying that the parallel force balance is broken. A first characterization of the instability is presented in [1], [2] analyzing the dependence on neutral pressure, magnetic field strength, plasma potential and ion species. A conducting boundary has recently been installed and aligned with the last closed flux surface of CNT. First results confirm the presence of the ion-driven instability after the installation of the boundary. This boundary can also be used to measure the changes in the image charges as the plasma oscillates, which serves as a diagnostic for a new set of experiments currently underway. These experiments will investigate the influence of the conducting boundary in the ion-driven instability and will determine the toroidal mode number of the instability. The results and progress on these experiments will be presented and compared with previous experimental results (when no conducting boundary was installed). [1] Q. R. Marksteiner et al. PRL 100, 065002 (2008). [2] Q. R. Marksteiner. Invited talk in this conference.

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