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Study of bound and unbound states in the halo nucleus ^{11}Be using the ^{10}Be(d,p) reaction in inverse kinematics[1] K.T. SCHMITT, Department of Physics and Astronomy, University of Tennessee, ORRUBA COLLABORATION, RIBENS COLLABORATION — Light neutron-rich nuclei have been used widely as test cases for ab initio theory, especially to test its ability to predict phenomena that do not occur in stable nuclei, such as halo structure. Extensive experimental data demonstrates that level inversion of the lowest states leads to halo properties in the ground state of ^{11}Be. Less is known, however, about the excited states of this nucleus. Specifically, the spectroscopic factor of the only bound excited state is disputed and spin-parity assignments for the unbound states are unconfirmed or tentative. A neutron transfer experiment at the HRIBF should improve our understanding of these states. The setup of this experiment will be described, including advancements in fast-timing MCP based detectors for low-Z beams, detection of recoils at small lab angles, and detector arrangement for the ORRUBA array.

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