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Cross-shell Excitations in ^{46}Ca studied with Fusion Reactions induced by Re-accelerated Rare Isotope Beams[1] JOHN ASH, HIRONORI IWASAKI, NSCL, MSU, TEA MIJATOVIC, Ruder Boskovic Institute, TAMAS BUDNER, ROBERT ELDER, BRANDON ELMAN, NSCL, MSU, MOSHE FRIEDMAN, Hebrew University of Jerusalem, ALEXANDRA GADE, MARA GRINDER, NSCL, MSU, JACK HENDERSON, LLNL, BRENDEN LONGFELLOW, NSCL, MSU, ALDRIC REVEL, NSCL, DANIEL RHODES, NSCL, MSU, MARK SPIEKER, FSU, YUTAKA UTSUNO, ASRC, JAEA, DIRK WEISSHAAR, NSCL, CHING-YEN WU, LLNL — The evolution of shell structure has been investigated by tracking the nuclear structure information of low-lying states from stability toward the neutron dripline. Discovering unexplored high-spin states can open up a new direction to study band structure and the associated shell structure in the neutron-rich regime. However, experimental reach has so far been limited to neutron-deficient or stable nuclei due to the nature of fusion reactions used in such studies. We report the first gamma ray spectroscopy with fusion reactions using reaccelerated rare isotope beams at the ReA3 facility of the National Superconducting Cyclotron Laboratory. Using particle and gamma coincidence techniques, three new higher-lying states around 6 MeV and five new gamma transitions were identified for ^{46}Ca, suggesting three independent band structures. New results are compared to large-scale shell model calculations.

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