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First study of single-neutron excitations of ^{207}Hg via the $^{206}\text{Hg}(\text{d},\text{p})$ reaction¹ TSZ LEUNG TANG, Argonne National Laboratory — We report the first exploration of the single-neutron shell structure of ^{207}Hg , which located below $Z = 82$ and with $N > 126$ in an almost unexplored region of the nuclear chart. The $^{206}\text{Hg}(\text{d},\text{p})$ neutron-adding reaction in inverse kinematics at 7.4 MeV/u was performed at CERN's HIE-ISOLDE facility. The single-neutron excitations in ^{207}Hg were determined from the scattered protons, which were detected using the new ISOLDE Solenoidal Spectrometer at a magnetic field strength of 2.5 T. The Q-value resolution was 140 keV FWHM. Angular distributions suggest that the $0g_{9/2}$, $2d_{5/2}$, $3s_{1/2}$, $2d_{3/2}$ and $0g_{7/2}$ states were observed. An extrapolation of the single-particle energies using ^{209}Pb and ^{207}Hg as anchors towards the neutron threshold plays an important role in improving our understanding the r-process nucleosynthesis in this region.

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