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Photoactivation of ^{176m}Lu via Bremsstrahlung at the Stuttgart DYNAMITRON BRIAN GODDARD, Drexel University, TOM HENRY, University of Surrey, TREVOR BALINT, Youngstown State University, HEINZ-HERMANN PITZ, FRANK STEDILE, ULRICH KNEISSL, University of Stuttgart, JEREMY GAISON, TRISTAN WINICK, Drexel University, JAMES CARROLL, US Army Research Laboratory — Though unstable, the ground state of ^{176}Lu has a very long half-life of approximately 37 billion years and primarily β^- decays (>99.9%) to ^{176}Hf. However, ^{176}Lu possesses an isomer ($J^\pi = 7^-$) 123 keV above the ground state ($J^\pi = 1^-$) that also β^- decays to ^{176}Hf but with a much shorter half-life of about 3.6 hours. The study of this isomer could lead to new findings regarding astrophysical nucleosynthesis. A disparity between the predicted abundance of ^{176}Lu due to nucleosynthesis and the actual measured abundance implies that transitions from the isomer to the ground state via intermediate states must have taken place during the s-process. Since the rates at which these transitions occur are temperature dependent, ^{176}Lu could be used as an s-process "thermometer." A photoactivation experiment was performed on ^{176}Lu at the Stuttgart DYNAMITRON using bremsstrahlung with varying endpoints between 0.7 and 2.2 MeV to determine the intermediate state energies and integral cross sections for the transitions that lead to the isomer. We present the results of the analysis of the data as well as preliminary values for the intermediate state energies and their cross sections.

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