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Study of the ^{12}C(α,Υ)^{16}O reaction via cross section measurements of ^{12}C(^{6}Li,d)^{16}O and ^{12}C(^{7}Li,t)^{16}O SHAMIM AKHTAR, CARL BRUNE, THOMAS MASSEY, DEVON JACOBS, DONALD CARTER, SUSHIL DHAKAL, Ohio University — The ^{12}C(α,Υ)^{16}O reaction is crucial for the understanding of helium burning in massive stars, but the cross section for this reaction at low energy is far too small for direct measurement using presently available techniques. Despite many experimental studies in the last four decades, the low-energy cross section of the ^{12}C(α,Υ)^{16}O reaction remains highly uncertain. To address this problem, a new determination of the ^{12}C(α,Υ)^{16}O reaction cross-section has been performed via a measurement of the transfer reactions ^{12}C(^{6}Li,d)^{16}O and ^{12}C(^{7}Li,t)^{16}O at the Edwards Accelerator Laboratory at Ohio University, Athens. The differential cross-section of the reactions has been measured for the 0^{+} (6.05 MeV), 3^{-} (6.13 MeV), 2^{+} (6.92 MeV), and 1^{-} (7.12 MeV) states of ^{16}O. Those measurements have been done by detecting the charged particles, deuterons and tritons. The time of flight technique was used to separate the different particles resulting from various possible reactions.

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