NEW STUDY OF THE ASTROPHYSICAL REACTION
\[ ^{12}\text{C}(\alpha, \gamma)^{16}\text{O} \]

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\[ ^{12}\text{C}(\alpha, \gamma)^{16}\text{O} \] capture reaction is considered to be the most important thermonuclear reaction in non-explosive astrophysical sites and its reaction rate is an important nuclear parameter in many stellar evolution models. This reaction was investigated through the direct-transfer reaction \((^7\text{Li}, \text{t})\) at 28 and 34 MeV incident energies. After the determination of the reduced-widths of the subthreshold 2+ and 1 states of 16 O from the DWBA analysis and the E2 and E1 S-factor from 0.01MeV to 4.2MeV in the center-of-mass energy and also the numerical determination of the reaction rate of this reaction at \(r=6.5\) fm and at a different stellar temperature \((0.06 \text{ Gk-2 GK})\), we will determine a new reaction rate of this reaction at \(r=7.7\) fm.