

Neutron and Proton Captures on ^{16}O

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We revisit neutron and proton captures on ^{16}O from astrophysics interest. Structure information is extracted from RMF+ACCC+BCS approach by NL1, NL2, NL3, NLSH and TM1 interactions, in which bound states, resonant states and pairing can be treated in a self-consistent microscopic way. Meanwhile, new Woods-Saxon potentials are proposed to reproduce the experimental one-nucleon separation energies and charge radii. With those structure information, reaction rates are calculated and compared with available JINA database. Single-particle resonance contributions are quantitatively considered and their roles in reaction rates are shown.