X particle effect for ^{6}Li reaction rates calculations*

G.Kocak[1,2†], A.B.Balantekin_[2],
[1] *Department of Physics, Erciyes University, Kayseri, 38039, Turkey and*
[2] *Department of Physics, University of Wisconsin, Madison, WI, 53706, USA*

The inferred primordial ^{6}Li-^{7}Li abundances are different from standard big bang nucleosynthesis results, ^{6}Li is 1000 times larger and ^{7}Li is 3 times smaller than the big bang prediction. In big bang nucleosynthesis, negatively charged massive *X* particles a possible solution to explain this primordial Li abundances problem [1]. In this study, we consider only *X* particle effect for nuclear reactions to obtain S-factor and reaction rates for Li. All S-factors calculated within the Optical Model framework for $d(\alpha,\gamma)^{6}$Li system. We showed that the enhancement effect of massive negatively charged *X* particle for ^{6}Li system reaction rate.

[1] M. Pospelov, Phys. Rev. Lett. **98** 231301 (2007).

---

*This work was supported by supported by the Scientific and Technical Research Council of Turkey (TUBITAK).
†Present address: Department of Physics, Erciyes University, Kayseri, 38039, Turkey.