$^{12}C(^{9}C,X)$ 1996Oz01

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	J. H. Kelley, B. Grees	ENSDF	31-July-2020

Reaction and interaction cross section measurements including Be, C, Al, Si, Sn and Pb targets.

1996Oz01: Measured total interaction σ of E≈790 MeV ^{9}C on Be, C and Al target at LBNL using the transmission method. Deduced point-proton $r^{p}_{r.m.s}$=2.48 fm *3*, effective charge $r^{ch}_{r.m.s}$=2.61 fm *3*, point-neutron $r^{n}_{r.m.s}$=2.28 fm *3* and point-nucleon $r^{m}_{r.m.s}$=2.42 fm *3*.

1997Bl08: Measured $\sigma_{interaction}$, σ_{1p} and σ_{2p} on carbon, ^{27}Al, tin and lead targets using 285 MeV/nucleon ^{9}C ions at GSI.

2000MoZP, 2002HiZZ, 2003Mo23, 2003Mo28, 2003MoZY: A study of the the reaction, via the inverse Coulomb dissociation reaction was carried out ar RIPS/RIKEN using a 65 MeV/nucleon ^{9}C beam on a Pb target. The results are analyzed to estimate the astrophysical S-factor. See other relevant theoretical discussion in (2005Ty02, 2012Fu07).

2003En05: Measured σ_{1p} and σ_{2p} at 78 MeV/nucleon on a carbon target at the MSU/NSCL. Deduced $C^{2}S$=0.94 from analysis of σ_{1p}. They also deduced the Asymptotic Normalization Coefficient, C^{2}_{l}=1.27 fm^{-1} *10*, and they evaluated the $^{8}B(p,\gamma)$ astrophysical reaction rate coefficient $S_{18}(0)$=49 eV·b *4*.

2004Wa06: Measured σ_{1p} and σ_{2p} on a Si target in the range of E(^{9}C)=28-68 MeV/nucleon at the MSU/NSCL. Compared with shell model calculations using eikonal reaction theory. In the range of E(^{9}C)=28-51 MeV/nucleon, σ_{2p}=198 mb *16* while σ_{1p}=77 mb *11*, suggesting ^{9}C may be a 2-proton halo nucleus.

2006Wa18: Measured the reaction and proton removal σ(E) for $^{28}Si(^{9}C,X)$ for E=15-53 MeV/nucleon at the MSU/NSCL. Analyzed the cross section data using a simple Glauber model, and assuming harmonic oscillator wavefuction densities they deduced a matter radius $r^{m}_{r.m.s.}$=2.71 fm *32*. They compared with the results of (1996Oz01).

Theory:

2003Ti10: Analyzed p-p correlations and single-particle overlap integrals. Discussed ^{9}C in terms of a potential 2p-halo nucleus.

2017Ah08: Glauber model analysis of $^{12}C(^{9}C,X)$ at 720 MeV/nucleon to obtain the charge and matter radii.

2017Ka45: Matter and charge radii, deduced from an optical potential model, were used to calculate the reaction cross sections of ^{9}C and other carbon isotopes at E_{p}=71-800 MeV.

^{9}C Levels

E(level)	$C^{2}S$	Comments
0	0.94	$r^{m}_{r.m.s.}$=2.42 fm *3* (1996Oz01), see also $r^{m}_{r.m.s.}$=2.71 fm *32* (2006Wa18). $C^{2}S$: for (^{9}C,^{8}B) from (2003En05); they also deduced the Asymptotic Normalization Coefficient, C^{2}_{l}=1.27 fm^{-1} *10*.