Contribution ID: **10** Type: **not specified**

A new evaluation of 17O system (preliminary)

Thursday, 11 November 2021 14:00 (25 minutes)

A new evaluation of 17O system is made. The reaction channels includes:
‘16O(N,N0)16O0 ‘ ‘16O(N,4HE)13C0 ‘ ‘16O(N,N1)16O1 ‘
‘16O(N,N2)16O2 ‘ ‘16O(N,N3)16O3 ‘ ‘16O(N,N4)16O4 ‘
‘16O(N,4HE1)13C1 ‘ ‘16O(N,4HE2)13C2 ‘ ‘16O(N,4HE3)13C3 ‘
‘13C(4HE,4HE)13C0’ ‘13C(4HE,N0)16O0 ‘ ‘13C(4HE,N1)16O1 ‘
‘13C(4HE,N2)16O2 ‘ ‘13C(4HE,N3)16O3 ‘ ‘13C(4HE,N4)16O4 ‘
‘13C(4HE,4HE)13C1’ ‘13C(4HE,4HE)13C2’ ‘13C(4HE,4HE)13C3’,

and a reduced channel (used for 8 to 30 MeV), which represents the total contribution of other channels.
The energy range of experimental data is 1e-7 to 30 MeV. The fitting looks good. A full set of integral cross section evaluation values are given, which includes (n, tot), (n,el), (n, inl), (n, n1), (n, n2), (n, n3), (n, n4), and (α, n), (α, n0), (α, n1), (α, n2), (α, n3). Special attention is paid to the impact of new data on the evaluation. Boromiza (2020)’s new data on (n, INL) play a positive role of constraint and obvious improvement, Gazeeva (2020)’s new data on (α, n0) (180 degrees) is acceptable. In deBoer’s new data, (α, γ6130) plays a positive role of constraint and significant improvement, and the differential cross section of (α, n0) plays a positive role of constraint and significant improvement. But, in Dr. deBoer’s new data, the (α, γ6050) and all other data on (α, n1) are difficult to use.
Theoretically, the ground state of 16O is 0+, the first excited state (6050) is 0-, and the second excited state (6130) is 1.5-. So for gamma transitions, 0- to 0+ is forbidden, 1.5- to 0+ is open. So, (n, n2) is much larger than (n, n1), as the evaluation values in ENDF/B7 and RAC2015, and (α,n2) should be much larger than (α,n1), the (α, γ6130) should be larger than (α, γ6050), However, in deBoer’s data, it’s just the other way around, the (α, γ6050) is much larger than (α, γ6130), which requires careful study of the reasons why.

Primary authors: Prof. CHEN, Zhenpeng (Tsinghua University); ZHOU, Libo (China Academy of Engineering Science); SUN, Yeying (China Academy of Engineering Science)

Presenter: Prof. CHEN, Zhenpeng (Tsinghua University)

Session Classification: Session 4