

Table 18.16 from (1978AJ03): Isospin-mixed states in  $^{18}\text{F}$  from  $^{16}\text{O}(d, \alpha_1)$  (1973JO13) <sup>a</sup>

	$E_d$ (MeV)	$E_x(^{18}\text{F})$ (MeV)	$\Gamma_{\text{c.m.}}$ (keV)	Strength $ S(E_x) $	Footnote
$J^\pi = 1^-$					
1	3.021	10.209	93	0.132	
2	3.179	10.349	269	0.136	b
3	3.454	10.594	157	0.054	b
4	3.492	10.627	58	0.036	
5	3.809	10.909	241	0.053	b
6	4.031	11.106	1009	0.028	c
7	4.847	11.831	179	0.108	b
8	5.390	12.313	100	0.078	d,e
9	5.571	12.474	35	0.098	d,e
10	6.353	13.168	184	0.038	d,e
11	6.662	13.442	77	0.049	d,e
12	6.847	13.606	88	0.023	d,e
13	7.244	13.959	69	0.046	d,e
14	7.832	14.481	203	0.036	d,e
15	8.082	14.703	169	0.121	d,e
16	8.865	15.398	157	0.056	d,e
17	9.255	15.744	249	0.056	d,e
18	9.692	16.132	355	0.044	d,e
19	9.781	16.211	181	0.084	d,e
20	10.499	16.849	78	0.037	d,e
21	11.367	17.619	313	0.032	d,e
22	11.799	18.002	203	0.033	d,e
23	12.682	18.786	1072	0.017	d,e
$J^\pi = 2^+$					
1	2.020	9.320	40		f,g
2	2.620	9.853	195	0.037	b
3	3.138	10.313	572	0.034	
4	3.366	10.516	46	0.105	b
5	3.471	10.609	151	0.062	b
6	3.547	10.676	62	0.041	

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7	3.578	10.704	375	0.168	h
$J^\pi = 2^+$ (continued)					
8	3.684	10.798	85	0.034	
9	3.849	10.944	402	0.061	h
10	3.904	10.993	222	0.061	h
11	3.944	11.029	78	0.179	
12	3.989	11.069	51	0.149	
13	4.253	11.303	475	0.088	
14	4.267	11.316	94	0.083	
15	4.480	11.505	126	0.076	
16	4.655	11.660	240	0.057	
17	5.000	11.967	124	0.074	
18	5.190	12.135	219	0.087	
19	5.441	12.358	78	0.135	
20	5.462	12.377	116	0.266	
21	5.742	12.625	231	0.088	d,e
22	5.786	12.664	288	0.090	d,e
23	5.954	12.184	441	0.113	d,e
24	6.151	12.988	648	0.056	d,e
25	6.487	13.287	99	0.078	d,e
26	6.726	13.499	146	0.077	d,e
27	6.954	13.701	78	0.048	d,e
28	7.074	13.808	263	0.097	d,e
29	7.400	14.097	166	0.166	d,e
30	8.228	14.833	124	0.069	d,e
31	8.310	14.905	1201	0.055	d,e
32	9.349	15.828	20	0.040	d,e
33	9.643	16.089	103	0.038	d,e
34	9.909	16.325	292	0.032	d,e
35	10.494	16.844	47	0.038	d,e
36	11.567	17.797	78	0.025	d,e
37	12.951	19.025	1894	0.023	d,e

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38	13.366	19.393	483	0.039	d,e
$J^\pi = 3^-$					
1	1.950	9.258	30		b,f,g
2	2.448	9.700	372	0.019	
3	3.126	10.302	179	0.065	b
4	3.254	10.416	48	0.089	b
5	3.508	10.642	236	0.140	b
6	3.562	10.690	75	0.122	b
7	3.892	10.983	119	0.020	b
8	4.069	11.140	35	0.102	b,g
9	4.208	11.263	238	0.088	b
10	4.276	11.324	65	0.190	b,g
11	4.543	11.561	67	0.032	b
12	4.993	11.960	32	0.072	b
13	5.175	12.122	36	0.036	b
14	5.414	12.334	187	0.043	b
15	5.606	12.505	88	0.082	b,i
16	5.867	12.736	63	0.055	b,i
17	6.048	12.897	120	0.072	d,e,g
18	6.198	13.030	248	0.122	d,e
19	6.650	13.432	233	0.107	d,e
20	7.025	13.764	206	0.086	d,e
21	8.530	15.101	115	0.067	d,e
22	8.616	15.177	299	0.045	d,e
23	8.906	15.434	123	0.033	d,e
24	9.403	15.876	272	0.082	d,e
25	9.771	16.202	77	0.023	d,e
26	10.333	16.701	296	0.034	d,e
27	10.533	16.879	251	0.042	d,e
28	10.911	17.214	112	0.023	d,e
29	11.592	17.819	273	0.016	d,e

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$J^\pi = 4^+$					
1	4.264	11.313	38	0.040	b,g
2	5.617	12.514	47	0.083	b,g,i
$J^\pi = 4^+$ (continued)					
3	6.235	13.063	10	0.0	b,f
4	6.393	13.203	254	0.168	
5	6.461	13.264	359	0.129	
6	6.839	13.599	41	0.027	
7	6.936	13.685	61	0.074	i
8	7.067	13.802	132	0.045	i
9	7.406	14.103	73	0.036	
10	7.839	14.487	76	0.051	
11	8.308	14.904	304	0.057	
12	8.570	15.136	156	0.039	
13	9.032	15.546	319	0.030	d,e
14	9.223	15.716	237	0.031	d,e
15	9.476	15.940	153	0.030	d,e
16	9.748	16.182	149	0.046	d,e
17	10.049	16.449	52	0.022	d,e
18	10.406	16.766	135	0.035	d,e
19	10.777	17.095	86	0.017	d,e
20	11.332	17.588	208	0.045	b,d
21	12.990	19.060	416	0.030	d,e
$J^\pi = 5^-$					
1	5.785	12.664	379	0.026	b
2	5.799	12.676	46	0.151	b,g,i
3	6.383	13.194	94	0.054	b,i
4	6.561	13.353	33	0.056	b,g,i
5	6.721	13.495	75	0.032	b
6	6.877	13.633	313	0.029	b
7	7.286	13.996	177	0.038	b,i
8	7.404	14.101	250	0.045	b,i

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9	8.350	14.941	126	0.033	b
10	8.385	14.972	491	0.044	b
11	9.073	15.583	174	0.042	b
12	9.329	15.810	1044	0.035	b,c
$J^\pi = 5^-$ (continued)					
13	10.357	16.722	212	0.064	b
14	10.431	16.788	209	0.052	b
15	10.728	17.052	180	0.019	
16	12.135	18.301	554	0.022	b
17	12.556	18.674	208	0.011	b
$J^\pi = 6^+$					
1	8.216	14.822	91	0.021	b
2	8.766	15.310	100	0.018	b
3	9.200	15.695	174	0.014	b
4	10.457	16.811	86	0.023	b
5	10.888	17.194	88	0.015	b
6	11.704	17.918	155	0.025	b
7	13.307	19.341	911	0.013	c
$J^\pi = 7^-$					
1	11.869	18.065	223	0.017	b
2	12.495	18.620	395	0.009	b
3	13.080	19.139	477	0.012	b

<sup>a</sup> This table does not include other maxima observed in  $^{16}\text{O} + d$ : see Table 18.15 for the latter. See also Table 18.17 in (1972AJ02) and (1969JO09, 1970JO1C). (1971JA04) also report  $\alpha_1$  resonances at  $E_p = 14.35$  and  $14.95 \pm 0.10$  MeV ( $\Gamma \approx 300$  and  $\approx 550$  keV) corresponding to  $^{18}\text{F}^*(20.3, 20.8)$ .

<sup>b</sup> This level is unambiguous in the  $S$ -matrix elements and the uncertainties in  $E_x$  and  $\Gamma$  are estimated to be  $\approx 15\%$  of  $\Gamma$ .

<sup>c</sup> May be several narrower levels.

<sup>d</sup> Possibly an Ericson fluctuation.

<sup>e</sup> Uncertain because of ambiguities in the  $S$ -matrix analysis.

<sup>f</sup> This level was not used in fitting the  $S$ -matrix elements.

<sup>g</sup> An  $^{18}\text{O}$  state of same  $J^\pi$  has been identified near the corresponding  $E_x(^{18}\text{O})$ .

<sup>h</sup> Main components of the  $2^+$  structure near  $E_d = 3.7$  MeV. The structure may possibly be reproduced by another set of levels.

<sup>i</sup> A level of the same  $J^\pi$ , approximate width, and  $E_x(^{18}\text{F})$  occurs in  $^{14}\text{N}(\alpha, \alpha_1)^{14}\text{N}$ .