Energy levels and branching ratios [93Ti07].

$^{17}_{9}$F

E^* [keV]	$2J^\pi$	$2T$	C^2S (τ,d)	C^2S (τ,d)	S_N (τ,d)	C^2S (α,t)	σ (α,t) μb	$T_{1/2}$ or Γ_{cm}	Ref.
0.0	5^+	1	1.00	0.93	0.6	1.3	7200	64.49(16) s	94Ve04 75Fo16 92Ya08
495.33(10)	1^+		0.82	0.84		0.75	110	286(6) ps	94Ve04 75Fo16 92Ya08
3104(3)	1^-							19(1) keV	
3857(4)	5^-							1.5(2) keV	
4640(20)	3^-							225 keV	
5000(20)	3^+					0.54	360	1530 keV	92Ya08
5220(10)	9^-								
5488(11)	3^-							68 keV	
5672(20)	7^-					0.14	820	40 keV	92Ya08
5682(20)	$\langle 5^- \rangle$							<0.6 keV	
5820(20)	3^+					0.17	120	180 keV	92Ya08
6037(9)	1^-							30 keV	
6560(20)	1^+							200 keV	
6697(7)	5^+							$\leq$1.8 keV	
6774(20)	$\langle 3^+ \rangle$					$\langle 0.06 \rangle$	130	4.5 keV	92Ya08
7027(20)	5^-							3.8 keV	
7356(20)	$\langle 3^+ \rangle$					0.03	0.06	10(2) keV	92Ya08
7448(20)								$\leq$5 keV	
7454(20)								7(2) keV	
7471(20)								5(2) keV	
7479(20)	3^+					0.13	0.14	795 keV	92Ya08
7546(20)	7^-					0.03	0.14	30 keV	92Ya08
7750(40)	$\langle 1^+ \rangle$							179(30) keV	
7950(30)								10(3) keV	
8010(40)								50(20) keV	
8070(30)	$5^{\langle + \rangle}$							100(20) keV	
8075(10)	$\langle 1,3 \rangle^-$								
8200	$3^{\langle - \rangle}$							700(250) keV	
8383(10)	$5^{\langle - \rangle}$							11(5) keV	
8416(20)	$\langle 7^+ \rangle$					0.13	220	45(10) keV	92Ya08
8436(10)	$\langle 1,3 \rangle^-$								
8750(60)	$5^{\langle + \rangle}$							170(30) keV	
8760	3^+							90(20) keV	
8825(25)	$\langle 1,3 \rangle^-$								
8980(20)	7^-					0.06	120	165(30) keV	92Ya08
9170(60)	$3^{\langle + \rangle}$							140(30) keV	
9450(50)						0.04	40	200(40) keV	92Ya08
9920	9^+							90(30) keV	
10030(60)								170(40) keV	
10040(40)	7							280(100) keV	
10220(40)								250(80) keV	
10400(40)	$5^{\langle + \rangle}$							160(40) keV	
10499(30)	7^-							165(25) keV	
10660(20)								90(60) keV	
10790(40)								120(40) keV	

(continued) $^{17}_{9}$F

E^* [keV]	$2J^\pi$	$2T$	C^2S (τ,d)	C^2S (τ,d)	S_N (τ,d)	C^2S (α,t)	σ (α,t) μb	$T_{1/2}$ or Γ_{cm}	Ref.
10910(10)	1^-							560(100) keV	
10950(40)								190(50) keV	
11192.9(23)	1^-	3						0.18(3) keV	
11430(40)								240(50) keV	
11580(50)								160(30) keV	
12000(40)								120(40) keV	
12250(40)	3^-							300(30) keV	
12355(20)	1^-							190(20) keV	
≈12500	7^-							≈600 keV	
12550.1(9)	3^-	3						2.83(12) keV	
13061(4)	5^-	3						2(1) keV	
13080(4)	$\langle 1^+ \rangle$	3						2(1) keV	
13130(10)	5^-							520(50) keV	
13781(4)	5^+	3						12(5) keV	
14000(50)	7^-							260(30) keV	
14176(6)	3^-	3						30(5) keV	
14304(3)	7^-	3						19.3(16) keV	
14380(50)	5^-							610(50) keV	
14710(10)	1^-							470(100) keV	
14809(20)	1^+							190(25) keV	
15600								≈550 keV	
17100	5^-							1500 keV	
20100(20)								1070(60) keV	
20400(10)								700(100) keV	
20900	9^+							600 keV	
21300(10)								900(100) keV	
21800	$\langle 9^+ \rangle$							400 keV	
22700	7^+							600 keV	
23800	7^+							600 keV	
25400	7^-							1500 keV	
27200	5^-							1500 keV	
28900	5^+							2000 keV	
			94Ve04			92Ya08	92Ya08		Ref.
				75Fo16	80Lu03				Ref.

Additional data on this isotope can be found in [02Mo19, 01Du12, 75Fo16, 73Et01].

Transitions with branching 100% were observed from levels at E^*=3104 and 3857 keV, respectively, to the ground state and to the level at E^*=495 keV.

Values C^2S were obtained in [94Ve04] where they were compared with C^2S from [75Fo16] given in the second column and with C^2S=0.60 for the ground state measured in [80Lu03].

Energy levels and branching ratios [93Ti07]. Part 2 **$^{17}_{9}$F**

E^*	$2J^\pi$	Branching ratios in percentage	
	E_f^*:	0.0	495.33
[keV]	$2J_f^\pi$:	5^+	1^+
495.33(10)	1^+	100	
3104(3)	1^-		100
3857(4)	5^-	100	
11192.9(23)	1^-		100

Energy levels and branching ratios [95Ti07]. **$^{18}_{9}$F**

E^*	J^π	T	ℓ_n	C^2S	Ratio	σ (α,t)	σ (τ,p)	$T_{1/2}$ or	Ref.	Branching ratios in percentage				
										E_f^*: 0.0	937	1041	1080	1121
[keV]				(p,d)	(α,t)	μb	μb/sr	Γ_{cm}		J_f^π: 1^+	3^+	0^+	0^-	5^+
0.0	1^+	0	0	0.65	1.38	260	3600	109.8(1) m	80De05					
937.20(6)	3^+	0	2	1.47	0.78	410	5370	46.9(17) ps	80De05	100				
1041.55(8)	0^+	1	0	0.27			950	1.77(31) fs	80De05	100				
1080.54(12)	0^-	0	1	0.38	1.04	1920	80	19.1(13) fs	80De05	100				
1121.36(15)	5^+	0					1620	162(7) ns	76Se12		100			
1700.81(18)	1^+	0	0	0.07			550	662(19) fs	80De05	30(1)		70(1)		
2100.61(10)	2^-	0	1	0.03			440	3.5(3) ps	80De05	38(1)	31(1)		31(1)	
2523.35(18)	2^+	0	2	≈0	0.36	20	210	408(17) fs	80De05	75(2)	21(1)			
3061.84(18)	2^+	1	2	0.74	1.11	320	3700	<0.83 fs	80De05	23(1)	77(1)	0.11(3)		
3133.87(15)	1^-	0	1	1.04			120	0.27(1) ps	80De05	39(2)		34(2)	25(2)	
3358.2(10)	3^+	0	2	≈0			610	0.30(2) ps	80De05	45(5)	9(3)			
3724.19(22)	1^+	0	0	0.015	1.04	150	790	1.9(28) fs	80De05	5(2)		91(2)		
			+2	0.22					80De05					
3791.49(22)	3^-	0					220	1.32(9) ps	76Se12					
3839.17(22)	2^+	0	2	0.50			3850	13.2(19) fs	80De05	38(2)	9(1)			
4115.90(25)	3^+	0		≈0	0.96	430	330	63(15) fs	80De05	5(3)				
4225.8(7)	2^-	0	1	0.015			280	76(10) fs	80De05	23(2)	49(3)		3.2(10)	
4360.15(26)	1^+	0	0	0.04			120	19(7) fs	80De05					
4398.1(7)	4^-	0					920	40(8) fs	76Se12		13(4)			60(6)
4652(2)	4^+	1			0.94	610	1440	<7 fs	92Ya08		17(3)			83(3)
4753(3)	0^+	1	0	0.03			40		80De05	92(4)				
			+2	0.08			20		80De05					
4848.3(5)	5^-	0						3.6(6) ps						65(4)
4860(2)	1^-	0	1	⟨0.11⟩			530	46(12) fs	80De05			65(11)	8(6)	
4963.6(8)	2^+	1	2	≈0			350	<3 fs	80De05	100				
5297.6(15)	4^+	0					450	21(3) fs	76Se12		9(2)			7(2)
5502(2)	$3^{\langle - \rangle}$	0					80	44(17) fs	76Se12					
5603.38(27)	1^+						3720	43.3(16) eV	76Se12	17(2)		4(1)		
5604.86(28)	1^-	0+1	1	⟨0.82⟩			incl	<1 keV	80De05	7(1)		4.2(8)	54(3)	
5672.57(32)	1^-	0+1	1	⟨0.44⟩			340	<1 keV	80De05	6.2(4)		8.1(7)	52(3)	
5786(2)	2^-	0					130	10(7) fs	76Se12		40(8)		60(8)	
6096.4(11)	4^-	0					2650	0.24(3) keV	76Se12		4.9(9)			55(3)

(continued) **$^{18}_{9}$F**

E^*	J^π	T	ℓ_n	Ratio	σ (α,t)	σ (τ,p)	$T_{1/2}$ or	Ref.	Branching ratios in percentage				
									E_f^*:	0.0	937	1041	1080	1121
[keV]				(α,t)	μb	μb/sr	Γ_{cm}		J_f^π:	1^+	3^+	0^+	0^-	5^+
6108(3)	$\langle 1^+ \rangle$	0					34(3) eV			24(3)	11(3)			
6136.47(33)	0^+	1				980	<1 keV	76Se12		50(3)				
6163.2(9)	3^+	1				incl	14.0(5) keV			0.2(2)	51(3)			1.0(1)
6240.4(8)	3^-	0+1				1530	0.19(3) keV	76Se12			4.6(3)			
6242(3)	3^-	0+1				incl	0.18(4) keV				4.1(3)			
6262(3)	1^+	0					0.60(12) keV			100				
6283.2(9)	2^+	1				720	10.0(5) keV	76Se12		0.3(1)	67(3)	1.3(1)		
6310.5(8)	3^+	0				500	0.95(14) keV	76Se12		4.0(7)	11(1)			
6385.5(17)	2^+	0+1				180	0.49(9) keV	76Se12		1.5(5)	75(3)			
6484.9(15)	3^+	0				80	0.40(10) keV	76Se12		13(2)	33(2)			10(2)
6567.0(15)	5^+	0				200	0.56(13) keV	76Se12			15(2)			
6633(10)	1						80(2) keV							
6643.7(8)	2^-	1					0.60(7) keV				8.9(6)			
6647(4)	1^-						91(4) keV							
6777(1)	4^+	0				3950	9.2(10) keV	76Se12			12.6(9)			25.3(13)
6803.1(15)	1^+,2,3^+	0					<2 keV			20(2)	20(2)			
6809(5)	2^-						88(2) keV							
6811	$\langle 2^+ \rangle$						3.0(5) keV							
6857(10)	$\langle 3^- \rangle$					620	5.0(10) keV	76Se12						
6877.4(17)	3,4^-	0				incl	<2 keV							
7201(2)	$\langle 4^+ \rangle$	0				400	6.5 keV	76Se12						
7247(2)	$\langle 1^+ \rangle$	0					46.5 keV							
7291(2)	3^-						38 keV							
7315(4)	$\langle 3^- \rangle$	$\langle 0 \rangle$					52 keV							
7336(2)	1^-	1					16(2) keV			4.0(5)			54(2)	
7406(2)	1^+					650	14.6(14) keV	76Se12						
7447(10)				0.13	90	130	140 keV	92Ya08						
7454(2)	1^-						6 keV							
7478(2)	$\langle 2 \rangle$						12(3) keV				100			
7485(2)	$\langle 1^- \rangle$						32 keV							
7506(2)	4^-					370	12(2) keV	76Se12						
7513(2)							<4 keV				5(4)			
7528(2)	2^-	1					16.5(30) keV			10(3)	14(6)			
7532(5)							75 keV							
7555(2)	$\langle 1^- \rangle$					340	30 keV	76Se12						
7584(2)							9(2) keV			18(7)	14(12)			9(7)
7685(2)	3^+,4^+					3450	36(4) keV	76Se12						
7729(4)	≥ 1						66(5) keV							
7763(4)							70 keV							
7878(3)	≥ 2					1320	20 keV	76Se12						
7899(2)	$\langle 2^- \rangle$						38 keV							
7941(12)	$\langle 1^+ \rangle$						112 keV							
8064(6)	≥ 4					1140	60 keV	76Se12						
8115(8)							96 keV							
8209(2)	2^-						52 keV							

(continued) **$^{18}_{9}$F**

E^* [keV]	J^π	T	ℓ_n	C^2S (p,d)	Ratio (α,t)	σ (α,t) μb	σ (τ,p) μb/sr	$T_{1/2}$ or Γ_{cm}	Ref.	Branching ratios in percentage E_f^*: 0.0 937 1041 1080 1121 J_f^π: 1^+ 3^+ 0^+ 0^- 5^+
8238(2)	4^+						1030	20 keV	76Se12	
9020	$\langle 5^- \rangle$	$\langle 1 \rangle$			0.13	90	200		92Ya08	
9207(15)	$3,4^-$	0					920		76Se12	
9312(10)							1400		76Se12	
9500	$2,3^+$	0					130		76Se12	
9523(40)							600		76Se12	
9580(20)	6^+				0.29	190	1200		92Ya08	
10580(50)										
11220(30)	7^+									
12750	$\langle 6^- \rangle$	$\langle 1 \rangle$			0.12	30			92Ya08	
13830	$4^-,5^+$							60 keV		
14020	$4^-,5^+$							60 keV		
14100	$4^-,5^+$							60 keV		
14180(40)	$\langle 8^+ \rangle$									
14650	$\langle 7^+ \rangle$				0.10	70			92Ya08	
15090	$4^-,5^+$									
15340	$5^+,6^-$									
15790(10)	$\langle 6^- \rangle$	$\langle 1 \rangle$			0.02	30			92Ya08	
16070	$4^-,5^+$							220 keV		
16720	$4^-,5^+$							60 keV		
17430	$4^-,5^+,6^-$							70 keV		
18620(12)										
19000(15)								500(15) keV		
20100(20)	$\langle 2^- \rangle$	$\langle 1 \rangle$						1600(10) keV		
22700(20)	$\langle 2^- \rangle$	$\langle 1 \rangle$						1200(10) keV		
24100(20)								1400(30) keV		
				80De05		92Ya08			Ref.	
					92Ya08		76Se12		Ref.	

C^2S from the (p,d) reaction [80De05]; Ratio=$\sigma_{exp}/\sigma_{cal}$ is similar to S_N for the (α,t) reaction [92Ya08].

Energy levels and branching ratios [95Ti07]. Part 2 **$^{18}_{9}$F**

E^* [keV]	J^π	Branching ratios in percentage E_f^*: J_f^π:	1701 1^+	2100.6 2^-	2523.3 2^+	3061.8 2^+	3133.9 1^-	3358.2 3^+	3724.2 1^+	3791.5 3^-
2523.35(18)	2^+		3.9(6)							
3133.87(15)	1^-		2.0(5)							
3358.2(10)	3^+		40(4)	<3	6(3)					
3724.19(22)	1^+					4(2)				
3791.49(22)	3^-			68(4)	2.2(11)	30(3)				
3839.17(22)	2^+		3(1)			50(3)				

(continued) $^{18}_{9}\mathbf{F}$

E^*	J^π	Branching ratios in percentage							
	E_f^*:	1701	2100.6	2523.3	3061.8	3133.9	3358.2	3724.2	3791.5
[keV]	J_f^π:	1^+	2^-	2^+	2^+	1^-	3^+	1^+	3^-
4115.90(25)	3^+				95(3)				
4225.8(7)	2^-	9.3(12)	15(5)			0.9(6)			
4360.15(26)	1^+				100				
4398.1(7)	4^-		27(3)						
4753(3)	0^+	8(4)							
4848.3(5)	5^-								35(4)
4860(2)	1^-				23(7)	4(3)			
5297.6(15)	4^+			78(3)			5(1)		
5502(2)	$3^{\langle-\rangle}$				100				
5603.38(27)	1^+				79(6)				
5604.86(28)	1^-				3(1)	32(3)			
5672.57(32)	1^-	0.8(3)	0.4(2)		4.0(4)	28.5(20)			
6096.4(11)	4^-		27(2)						1.4(3)
6108(3)	$\langle1^+\rangle$		20(6)		45(5)				
6136.47(33)	0^+	12(2)						36(3)	
6163.2(9)	3^+			5.5(4)	1.3(3)				11.6(13)
6240.4(8)	3^-		72(3)				1.1(4)		10.6(5)
6242(3)	3^-		71(3)				0.8(3)		11.6(6)
6283.2(9)	2^+	5.7(6)	1.2(3)	0.3(2)		0.7(3)	2.3(3)	1.4(5)	
6310.5(8)	3^+	3.0(8)		4.0(5)	57(3)			1.4(7)	
6385.5(17)	2^+	6.8(17)							
6484.9(15)	3^+	4(2)		4(2)	21(3)				4(2)
6567.0(15)	5^+						83(3)		
6643.7(8)	2^-		58(3)			22.0(13)		0.9(2)	2.4(2)
6803.1(15)	1^+,2,3^+				50(3)				
6877.4(17)	3,4^-		9(2)						
7336(2)	1^-		18(1)		1.0(5)	8.0(5)			
7513(2)			7(5)						33(5)
7528(2)	2^-		50(9)						26(7)

Energy levels and branching ratios [95Ti07]. Part 3 $^{18}_{9}\mathbf{F}$

E^*	J^π	Branching ratios in percentage										
	E_f^*:	3839.2	4115.9	4225.8	4360.1	4398.1	4652	4860	4963.6	5297.6	5502	5603.4
[keV]	J_f^π:	2^+	3^+	2^-	1^+	4^-	4^+	1^-	2^+	4^+	$3^{\langle-\rangle}$	1^+
5297.6(15)	4^+						1.3(3)					
6096.4(11)	4^-		1.8(3)			0.7(3)	8.7(7)					
6136.47(33)	0^+				2.1(4)							0.19(2)
6163.2(9)	3^+	25.0(16)	1.5(3)	0.9(3)		2.0(2)						
6240.4(8)	3^-	1.0(2)	0.5(2)	7.8(4)		2.9(3)						
6242(3)	3^-	0.9(2)	1.1(4)	8.2(4)		2.1(3)						
6283.2(9)	2^+	15.7(14)	3.9(2)		0.5(4)							

(continued) **$^{18}_{9}$F**

E^*	J^π	Branching ratios in percentage										
	E^*_f:	3839.2	4115.9	4225.8	4360.1	4398.1	4652	4860	4963.6	5297.6	5502	5603.4
[keV]	J^π_f:	2^+	3^+	2^-	1^+	4^-	4^+	1^-	2^+	4^+	$3^{\langle-\rangle}$	1^+
6310.5(8)	3^+	5(1)	2(2)						13(2)			
6385.5(17)	2^+	14.1(16)	2.3(5)									
6484.9(15)	3^+	9(2)							2(2)			
6567.0(15)	5^+									2.3(6)		
6643.7(8)	2^-		1.0(3)					2.6(2)			4.0(3)	
6777(1)	4^+						62(2)					
6803.1(15)	1^+,$2,3^+$	3.0(16)							7.0(17)			
6877.4(17)	$3,4^-$						91(2)					
7336(2)	1^-			15.0(6)								
7513(2)						55(7)						
7584(2)							59(16)					

Energy levels and branching ratios [95Ti07]. **$^{19}_{9}$F**

E^*	$2J^\pi$	$2T$	ℓ	C^2S'	S_N	S_N	σ (α,t)	Γ_α	ω_γ	L	σ (τ,p)	S_α	C^2S	Ref.
[keV]				(τ,d)	(τ,d)	(α,t)	μb	[eV]	[eV]	(τ,p)	μb/sr	(^{6}Li,d)	(d,τ)	
0.0	1^+	1	0	0.42*	0.45	0.38	130			2⟨+4⟩	53	0.13	0.76	95Ti07
109.894(5)	1^-		1	0.224	0.18					⟨1+3⟩	1.4	0.15	1.86	95Ti07
197.143(4)	5^+		2	2.45*	0.63	1.0	4840			0	330	0.031	1.70	95Ti07
1345.67(13)	5^-									3⟨+5⟩	3.8	0.10		79Bi05
1458.7(3)	3^-		1	0.098	0.054					1+3	6.2	0.091	0.47	95Ti07
1554.04(1)	3^-		2	1.01*	0.44	0.62	1220			0	340	0.21	0.50	95Ti07
2779.85(3)	9^+		4	0.027	<0.004					2	150	0.015	≈0.2	95Ti07
3908.2(2)	3^+									2+0	9.8	0.022		96Ma07
3998.7(7)	7^-		⟨3⟩	⟨0.02⟩	0.006	0.02	200			3⟨+5⟩	12	0.028	0.05	95Ti07
4032.5(12)	9^-									incl	6.8	incl		79Bi05
4377.70(4)	7^+		⟨4⟩	⟨0.05⟩	0.009			$3.6(12)\cdot10^{-9}$	$14(5)\cdot10^{-9}$	0+2	160			03Fo10
4549.9(8)	5^+		2	0.31	0.36			$3.2(4)\cdot10^{-5}$	$9.6(12)\cdot10^{-5}$	2	59			02Wi18
4556.1(5)	3^-												0.69	
4648(1)	13^+									4	94			79Bi05
4682.5(7)	5^-													
5106.6(9)	5^+			0.013	0.012			$3.3(6)\cdot10^{-3}$	$9.7(16)\cdot10^{-3}$	0+2	73			95Wi26
5337(2)	$1^{\langle+\rangle}$			0.0065		0.3	50				4.4			95Ti07
5418(1)	7^-			[0.04]	0.045	0.02	180			3⟨+5⟩	12			95Ti07
5463.5(15)	7^+									2	220		≈0.1	79Bi05
5500.7(17)	3^+					0.07	170							92Ya08
5535(2)	5^+			[0.14]	0.054	0.11	270			2+4	12			95Ti07
5621(1)	5^-									1+3	9.3		[0.3]	79Bi05
5938(1)	1^+		0	0.014		⟨0.2⟩	30							95Ti07
6070(1)	7^+													
6088(1)	3^-		1	0.12	0.32								0.47	95Ti07

(continued) **$^{19}_{9}$F**

E^* [keV]	$2J^\pi$	$2T$	ℓ	C^2S' (τ,d)	S_N (τ,d)	S_N (α,t)	σ (α,t) μb	Γ_α [eV]	ω_γ [eV]	L (τ,p)	σ (τ,p) μb/sr	S_α (^{6}Li,d)	C^2S (d,τ)	Ref.
6100(2)	9^-													
6160.6(9)	7^-					0.03	230							92Ya08
6255(1)	1^+		⟨0⟩	0.19	0.31	0.45								95Ti07
6282(2)	5^+					0.07	90							92Ya08
6330(2)	7^+													
6429(8)	1^-													
6496.7(14)	3^+				0.05	0.09	110							92Ya08
6500.0(9)	11^+													
6527.5(14)	3^+		2	[0.13]										95Ti07
6554(2)	$7^{\langle+\rangle}$													
6592(2)	9^+													
6787(2)	3^-		1	0.29	0.11								1.54	95Ti07
6838.4(9)	5^+				0.18									70Gr04
6891(4)	3^-													
6926.5(17)	7^-			0.385		0.07	560							92Ya08
6989(3)	1^-													
7114(6)	7^+		2	0.087	0.13									95Ti07
7166.2(7)	11^-													
7262(2)	3^+													
7364(4)	1^+		0	0.091		⟨0.5⟩	30							95Ti07
7539.6(9)	5^+	3	2	0.665	0.41	0.88	640							95Ti07
7560(10)	7^+													
7587	$\langle5^-\rangle$													
7660.6(9)	3^+	3	⟨2⟩	0.035	incl	0.13	90							95Ti07
7702(5)	1^-			⟨0.05⟩										95Ti07
7740(40)	5^-,7^-				0.16									70Gr04
7900														
7929(3)	7^+,9													
7937(3)	11^+													
8014.0(10)	5^+		2	0.26		⟨0.1⟩	130							95Ti07
8084(3)														
8137.7(12)	1^+		2,3	0.097										
8160			0,1	0.156										95Ti07
8199.0(10)	$\langle5^+\rangle$		2,3	0.035										95Ti07
8254.3(26)	$\langle5,7\rangle^-$			0.035										95Ti07
8288(2)	13^-													
8310.0(12)	5^+		2											
8370(4)	7,5^+													
8583.5(16)	5^+													
8591.9(10)	3^-													
8629(4)	7^-													
8650	1^+													
8793.2(15)	1^+	3	0	⟨0.13⟩		0.9	20							92Ya08
8864(4)	≤7													
8926.7(28)	3^-													

(continued) **$^{19}_{9}$F**

E^* [keV]	$2J^\pi$	$2T$	ℓ	C^2S' (τ,d)	S_N (τ,d)	S_N (α,t)	σ (α,t) μb	Γ_α [eV]	ω_γ [eV]	L (τ,p)	σ (τ,p) μb/sr	S_α (^{6}Li,d)	C^2S Ref. (d,τ)
8953(3)	11^-												
9030(5)	5,7												
9099.7(7)	7^-												
9101(4)	7^+,9^+												
9167.0(14)	1^+												
9204(7)	3												
9267(4)	11^+,9^+												
9280(5)	$\langle 7,9\rangle^+$												
9318(2)	3^+												
9321.0(11)	1^+												
9329(4)	≤ 3												
9509(4)	5^+,7^+												
9527(6)	$\langle 5\rangle$												
9536.4(20)	5^+												
9566(3)	3^-												
9575(4)	3^-												
9586(3)	7												
9642(6)	3,5												
9654(6)	3,5												
9667.5(15)	3^+												
9710(4)	9^+,11^-												
9820.0(10)	5^-												
9834(3)	11–15												
9874.0(18)	11^-												
9887(3)	1^+												
9895(5)													
9926(3)	9^+	3											
10088(5)	5^-,7^-												
10137(8)	3^-												
10162(3)	1^+												
10232(3)	1^+												
10254(3)	1^+												
10308(4)	3^+												
10365(4)	7–11												
10411(3)	13^+												
10469(4)													
10488(4)													
10496.3(13)	3^+												
10521(4)													
10542.3(11)													
10555(3)	3^+	3											
10564.7(20)													
10581(4)	$\langle 5^+\rangle$												
10614.3(16)	5^+	3											
10763.3(25)	1^-												

(continued) **$^{19}_{9}$F**

E^* [keV]	$2J^\pi$	$2T$	ℓ	C^2S' (τ,d)	S_N (τ,d)	S_N (α,t)	σ (α,t) μb	Γ_α [eV]	ω_γ [eV]	L (τ,p)	σ (τ,p) μb/sr	S_α (^{6}Li,d)	C^2S (d,τ)	Ref.
10859.7(19)	5^+													
10927(8)														
10975.0(25)	$\langle 3,5\rangle^+$													
10989.0(25)														
11072.0(27)	1^+													
11188(4)	$\langle 1^-\rangle$													
11273(3)														
11286(7)	5^+													
11350(25)	1^+													
11450.0(35)	1^-													
11478(5)														
11502(5)	$\langle 3^-\rangle$													
11540(7)	5^+													
11569(7)		3												
11603(12)	3^-													
11653(4)	3^+	$\langle 3\rangle$												
11840(10)														
11930(10)														
12040(20)	1^-													
12136(8)	3^-	3												
12222(12)	3^+													
12522(7)	1^-													
12577(10)	5^+													
12580(25)	1^-	3												
12780(10)	5^+	3												
12860(30)	3^+	3												
12940(25)	5^+													
12980(50)	1^-													
13068(4)	1^+													
13090(75)	3^-													
13170(15)														
13245(10)	1^-													
13270(10)	1^+													
13317(8)	7^-	$\langle 3\rangle$				0.04	40							92Ya08
13360(25)	3^-													
13532(10)	1^+													
13732(11)	7^-	3				0.11	60							92Ya08
13878(15)	1^+													
14040(20)	5^+													
14100(21)	3^-													
14147(20)	1^+													
14240(15)														
14255(15)	3^+													
14330(20)	3^-													
14352(10)	1^+													

(continued) **$^{19}_{9}$F**

E^*	$2J^\pi$	$2T$	ℓ	C^2S'	S_N	S_N	σ (α,t)	Γ_α	ω_γ	L	σ (τ,p)	S_α	C^2S	Ref.
[keV]				(τ,d)	(τ,d)	(α,t)	μb	[eV]	[eV]	(τ,p)	μb/sr	(^{6}Li,d)	(d,τ)	
14460(25)	3^+													
14460(25)	5^+													
14700(20)	3^-													
14720(70)	1^-													
14740(50)	1^+													
14780(20)	5^+													
14920(30)	7^-													
15000(20)														
15360(20)	1^-													
15400(30)	5^+													
15560(30)														
15770(21)	3^-													
16090(50)														
16200(40)	3^+													
16230(30)	7^-													
16280(20)	3^-													
16450(50)														
16800(30)														
17050(40)	3^-													
17160(40)	7^-													
17450(30)	3^-													
17650(60)	7^-													
17930(40)	3^-													
18030(60)	7^-													
18920(30)														
19070(60)	3^-													
19830(15)	5^-													
19890(30)	3^-													
20810(50)	1^-													
20930(50)	3^-													
21050(40)	7^-													
					70Gr04	92Ya08	92Ya08	03Fo10	03Fo10		79Bi05	96Ma07	70Ka31	Ref.
				70Sc25										Ref.

Additional data on this isotope can be found in [03Fo10, 01Du11, 00Fo01, 98Ut02, 97De14, 96Ma07, 79Fo06, 78Fo11, 65Er04].

Abundance: 100 %.

* For marked levels C^2S=0.41, 0.50, 0.37 were obtained also in [94Ve04]; these values were compared there with C^2S=0.30, 0.42 0.29 in [70Gr04] and C^2S=0.21, 0.42, 0.25 in [70Sc25].

Given here in the first column values C^2S' are product of (2J+1) and C^2S reported in [95Ti07].

Values S_N from [70Gr04] for the same (τ,d) reaction were derived from the relation $d\sigma/d\Omega_{exp}$=$4.42(2J_f+1)C^2S_N\sigma_{DWBA}/(2J_i+1)$.

Spectroscopic factors S_α correspond to the α-particle transfer in the (^{6}Li,d) reaction [96Ma07].

Data for this isotope are considered in vol. LB I/18A.

Energy levels and branching ratios [95Ti07]. Part 2

$^{19}_{9}$F

E^*	$2J^\pi$	σ (^{6}Li,d)	$T_{1/2}$ or	Ref.		Branching ratios in percentage				
					E_f^*:	0.0	110	197.1	1346	1459	1554.0
[keV]		μb/sr	Γ_{cm}		$2J_f^\pi$:	1^+	1^-	5^+	5^-	3^-	3^-
0.0	1^+	55	Stable	95Ti07							
109.894(5)	1^-	150	0.59(1) ns	95Ti07		100					
197.143(4)	5^+	50	89.3(10) ns	95Ti07		100	<0.1				
1345.67(13)	5^-	180	2.86(4) ps	79Bi05			96.8(10)	3.2(10)			
1458.7(3)	3^-	120	62(14) fs	95Ti07		21(1)	68.8(9)	10.7(5)	<0.2		
1554.04(1)	3^-	130	3.5(21) fs	95Ti07		2.6(1)	4.85(12)	92.6(2)	<0.01	<0.1	
2779.85(3)	9^+	40	194(21) fs	95Ti07				100			
3908.2(2)	3^+	16	6(3) fs	96Ma07		48(2)	17(2)	14(2)			21(3)
3998.7(7)	7^-	<200	13(5) fs	95Ti07				18(4)	70(4)	12(6)	
4032.5(12)	9^-	<200	46(10) fs	79Bi05					100		
4377.70(4)	7^+		<7.6 fs	03Fo10		<5	<2	81(2)			
4549.9(8)	5^+		<35 fs	02Wi18				69(7)	5(3)	8(3)	18(4)
4556.1(5)	3^-		12(6) fs			36(4)	45(5)	9(3)	4(3)	<4	6(3)
4648(1)	13^+		2.6(3) ps	79Bi05							
4682.5(7)	5^-		10.7(21) fs					5.6(9)	63(4)	31(2)	
5106.6(9)	5^+		<21 fs	95Wi26		80(4)			<1.6	10(3)	1.8(18)
5337(2)	$1^{\langle+\rangle}$		≤0.07 fs	95Ti07		37(4)	42(4)			20(2)	
5418(1)	7^-		2.6(7) eV	95Ti07					71	13	
5463.5(15)	7^+		≤0.18 fs	79Bi05				4	32		5
5500.7(17)	3^+		4(1) keV	92Ya08			25	49	16		11
5535(2)	5^+			95Ti07		7		47		45	
5621(1)	5^-		<0.9 fs	79Bi05				39(4)	61(4)		
5938(1)	1^+			95Ti07		7(4)	20(6)	2(1)		63(6)	<2
6070(1)	7^+		1.2 keV					53(5)	19(2)		1(1)
6088(1)	3^-		4 keV	95Ti07		25(4)	61(5)	14(3)			
6100(2)	9^-										
6160.6(9)	7^-		3.7(10) eV	92Ya08				31(3)	64(4)	1.3(6)	
6255(1)	1^+		8 keV	95Ti07							
6282(2)	5^+		2.4 keV	92Ya08		14(2)		4.2(10)	36(2)	26(2)	20(2)
6330(2)	7^+		2.4 keV					56(3)	17(2)		8.5(15)
6429(8)	1^-		280 keV								
6496.7(14)	3^+			92Ya08		38(2)	14(2)	9(2)	14(2)	25(2)	
6500.0(9)	11^+		>2.4 eV								
6527.5(14)	3^+		4 keV	95Ti07		29(2)	59(3)				
6554(2)	$7^{\langle+\rangle}$		1.6 keV					19(2)	55(4)		
6592(2)	9^+		7.6(18) eV					13(2)			
6787(2)	3^-		6.9(11) eV	95Ti07		15(2)	39(2)	13(2)	5.3(8)	25(2)	
6838.4(9)	5^+		1.2 keV	70Gr04		9(5)	9(5)	27(6)	10(7)	45(8)	
6891(4)	3^-		28 keV			9(2)			61(5)	30(5)	
6926.5(17)	7^-		2.4 keV	92Ya08				73(3)	22(2)		
6989(3)	1^-		51 keV								
7114(6)	7^+		32 keV	95Ti07							
7166.2(7)	11^-		6.9(11) eV								
7262(2)	3^+		<6 keV								
7364(4)	1^+			95Ti07							

(continued) **$^{19}_{9}$F**

E^*	$2J^\pi$	σ (^{6}Li,d)	$T_{1/2}$ or	Ref.	Branching ratios in percentage					
				E_f^*:	0.0	110	197.1	1346	1459	1554.0
[keV]		μb/sr	Γ_{cm}	$2J_f^\pi$:	1^+	1^-	5^+	5^-	3^-	3^-
7539.6(9)	5^+		0.16(5) keV	95Ti07			29(3)	1.2(4)		41(3)
7560(10)	7^+		<90 keV							
7587	$\langle 5^- \rangle$									
7660.6(9)	3^+		2.2(7) eV	95Ti07	38(4)		13(2)			36(2)
7702(5)	1^-		<30 keV	95Ti07						
7740(40)	5^-,7^-		<6 keV	70Gr04						
7900			<200 keV							
7929(3)	7^+,9						4			
7937(3)	11^+									
8014.0(10)	5^+			95Ti07						
8084(3)			<3 keV							
8137.7(12)	1^+		≤0.3 keV		7(1)	22(2)	7(1)			2(1)
8160			<50 keV	95Ti07						
8199.0(10)	$\langle 5^+ \rangle$		<0.8 keV	95Ti07						
8254.3(26)	$\langle 5,7 \rangle^-$		≤1.5 keV	95Ti07			18(7)	33(10)	24(8)	
8288(2)	13^-		<1 keV							
8310.0(12)	5^+		47(19) eV		12(1)					48(2)
8370(4)	7,5^+		7.5(15) keV				13(2)	39(3)		
8583.5(16)	5^+		≤0.5 keV		4(1)		37(5)	22(3)		19(3)
8591.9(10)	3^-		2.0(1) keV		5(2)	3(1)	42(2)	7(1)		28(3)
8629(4)	7^-		<1 keV				34(2)	6(1)	6(1)	
8650	1^+		≈300 keV			53(6)			23(6)	
8793.2(15)	1^+		46(2) keV	92Ya08	1.2(4)	30(1)	0.3(2)		22(1)	8(1)
8864(4)	≤7		≈1 keV					100		
8926.7(28)	3^-		3.6(2) keV		5(2)	10(2)	24(7)		25(7)	23(7)
8953(3)	11^-		≈1 keV							
9030(5)	5,7		4.2(10) keV				44(5)			
9099.7(7)	7^-		0.57(3) keV				2.0(3)	2.7(3)		
9101(4)	7^+,9^+		≈1 keV							
9167.0(14)	1^+		6.2(5) keV				51(2)			30(2)
9204(7)	3		10.2(15) keV		18(2)	46(3)	10(4)	26(3)		
9267(4)	11^+,9^+		2(1) keV							
9280(5)	$\langle 7,9 \rangle^+$		<1.5 keV							
9318(2)	3^+		3.4(7) keV							
9321.0(11)	1^+		5.0(2) keV		30(1)		12(1)		28(1)	17(1)
9329(4)	≤3		≈6 keV							100
9509(4)	5^+,7^+		<1 keV					14(2)		14(2)
9527(6)	$\langle 5 \rangle$		28 keV							
9536.4(20)	5^+		6.3(15) keV					26(2)		
9566(3)	3^-		26(3) keV				77(10)			
9575(4)	3^-		67(3) keV						26(2)	
9586(3)	7		8.9(12) keV					32(4)		
9642(6)	3,5		≈8 keV				13(3)	61(7)		
9654(6)	3,5		≈6 keV					41(9)		59(9)
9667.5(15)	3^+		3.6(4) keV		22(2)	20(2)	9(1)	9(1)	5(1)	10(1)

(continued) **$^{19}_{9}$F**

E^*	$2J^\pi$	σ (^{6}Li,d)	$T_{1/2}$ or	Ref.	Branching ratios in percentage					
				E_f^*:	0.0	110	197.1	1346	1459	1554.0
[keV]		μb/sr	Γ_{cm}	$2J_f^\pi$:	1^+	1^-	5^+	5^-	3^-	3^-
9710(4)	9^+,11^-		<1 keV							
9820.0(10)	5^-		0.30(5) keV			0.7(2)	41(2)	2.4(5)	8(1)	30(2)
9834(3)	11–15		<1 keV							
9874.0(18)	11^-		2.6(6) eV							
9887(3)	1^+		25(2) keV				15(8)		15(5)	
9895(5)										
9926(3)	9^+		≈1 keV				1(1)			
10088(5)	5^-,7^-		<1.5 keV				10(1)	35(2)		
10137(8)	3^-		4.3(6) keV					29(4)	71(4)	
10162(3)	1^+		31 keV							
10232(3)	1^+		<1 keV							
10254(3)	1^+		22 keV							
10308(4)	3^+		9.2 keV							
10365(4)	7–11		3.0(15) keV							
10411(3)	13^+		<1.5 keV							
10469(4)			11.0(12) keV							
10488(4)			4.8(8) keV							
10496.3(13)	3^+		5.7(6) keV							
10521(4)			14(2) keV							
10542.3(11)			2.5(2) keV							
10555(3)	3^+		4.0(12) keV							
10564.7(20)			4.6(7) keV							
10581(4)	$\langle 5^+ \rangle$		22(3) keV							
10614.3(16)	5^+		4.7(5) keV							
10763.3(25)	1^-		6(3) keV							
10859.7(19)	5^+		240.0(15) keV							
10927(8)										
10975.0(25)	$\langle 3,5 \rangle^+$		14(2) keV							
10989.0(25)			7(2) keV							
11072.0(27)	1^+		35(4) keV							
11188(4)	$\langle 1^- \rangle$		17(4) keV							
11273(3)			7(2) keV							
11286(7)	5^+		22(5) keV							
11350(25)	1^+		272(31) keV							
11450.0(35)	1^-		38(7) keV							
11478(5)			7(3) keV							
11502(5)	$\langle 3^- \rangle$		4(2) keV							
11540(7)	5^+		22(5) keV							
11569(7)			15(10) keV							
11603(12)	3^-		63(7) keV							
11653(4)	3^+		33(6) keV							
11840(10)			<50 keV							
11930(10)			90 keV							
12040(20)	1^-		71(24) keV							
12136(8)	3^-		105(14) keV							

(continued) **$^{19}_{9}$F**

E^*	$2J^\pi$	σ (^{6}Li,d)	$T_{1/2}$ or	Ref.	Branching ratios in percentage					
					E_f^*: 0.0	110	197.1	1346	1459	1554.0
[keV]		μb/sr	Γ_{cm}		$2J_f^\pi$: 1^+	1^-	5^+	5^-	3^-	3^-
12222(12)	3^+		74(1) keV							
12522(7)	1^-		15(4) keV							
12577(10)	5^+		48(10) keV							
12580(25)	1^-		285(48) keV							
12780(10)	5^+		95(38) keV							
12860(30)	3^+		276(38) keV							
12940(25)	5^+		71(24) keV							
12980(50)	1^-		124(38) keV							
13068(4)	1^+		$\leq$10 keV							
13090(75)	3^-		285(71) keV							
13170(15)			70 keV							
13245(10)	1^-		7 keV							
13270(10)	1^+		4.5 keV							
13317(8)	7^-		28(6) keV	92Ya08						
13360(25)	3^-		38(19) keV							
13532(10)	1^+		22 keV							
13732(11)	7^-		52(10) keV	92Ya08						
13878(15)	1^+		101 keV							
14040(20)	5^+		141(28) keV							
14100(21)	3^-		84(28) keV							
14147(20)	1^+		21 keV							
14240(15)			350 keV							
14255(15)	3^+		51 keV							
14330(20)	3^-		76(28) keV							
14352(10)	1^+		154 keV							
14460(25)	3^+		179 keV							
14460(25)	5^+		46 keV							
14700(20)	3^-		124(38) keV							
14720(70)	1^-		257(67) keV							
14740(50)	1^+		361(67) keV							
14780(20)	5^+									
14920(30)	7^-									
15000(20)										
15360(20)	1^-									
15400(30)	5^+									
15560(30)										
15770(21)	3^-		150 keV							
16090(50)										
16200(40)	3^+									
16230(30)	7^-									
16280(20)	3^-		200 keV							
16450(50)										
16800(30)										
17050(40)	3^-		331(67) keV							
17160(40)	7^-		323(67) keV							

(continued) **$^{19}_{9}$F**

E^*	$2J^\pi$	σ (^{6}Li,d)	$T_{1/2}$ or	Ref.	Branching ratios in percentage					
					E^*_f: 0.0	110	197.1	1346	1459	1554.0
[keV]		μb/sr	Γ_{cm}		$2J^\pi_f$: 1^+	1^-	5^+	5^-	3^-	3^-
17450(30)	3^-		32(19) keV							
17650(60)	7^-		95(57) keV							
17930(40)	3^-		255(57) keV							
18030(60)	7^-		365(57) keV							
18920(30)										
19070(60)	3^-		560(14) keV							
19830(15)	5^-		369(57) keV							
19890(30)	3^-		473(57) keV							
20810(50)	1^-		412(57) keV							
20930(50)	3^-		317(48) keV							
21050(40)	7^-		448(29) keV							
		96Ma07		Ref.						
				Ref.						

Energy levels and branching ratios [95Ti07]. Part 3 **$^{19}_{9}$F**

E^*	$2J^\pi$											
		E^*_f:	2779.8	3908.2	3998.7	4032.5	4377.7	4549.9	4556.1	4648	4682.5	5106.6
[keV]		$2J^\pi_f$:	9^+	3^+	7^-	9^-	7^+	5^+	3^-	13^+	5^-	5^+
4377.70(4)	7^+		19.5(10)									
4648(1)	13^+		100									
5106.6(9)	5^+		0.7(6)	5.4(9)			2.0(5)					
5418(1)	7^-				10	6						
5463.5(15)	7^+		59									
5938(1)	1^+			8(3)								
6070(1)	7^+		23(3)				4(1)					
6160.6(9)	7^-				1.6(6)	2.3(3)						
6330(2)	7^+						18(2)					
6500.0(9)	11^+		55							45		
6527.5(14)	3^+							12(2)				
6554(2)	$7^{\langle+\rangle}$		26(3)									
6592(2)	9^+		63(3)				24(2)					
6787(2)	3^-			2.6(10)								
6926.5(17)	7^-		2.4(5)		1.3(5)	1.3(5)						
7166.2(7)	11^-				5.6(7)	90.9(8)				3.5(5)		
7539.6(9)	5^+						27(3)					1.7(4)
7660.6(9)	3^+			3.0(25)				5.0(3)				5.8(5)
7929(3)	7^+,9		96									
7937(3)	11^+		10							90		
8137.7(12)	1^+			50(2)								
8254.3(26)	$\langle5,7\rangle^-$			25(8)								
8288(2)	13^-					93(4)				7(4)		

(continued) **$^{19}_{9}$F**

E^*	$2J^\pi$		Branching ratios in percentage									
		E_f^*:	2779.8	3908.2	3998.7	4032.5	4377.7	4549.9	4556.1	4648	4682.5	5106.6
[keV]		$2J_f^\pi$:	9^+	3^+	7^-	9^-	7^+	5^+	3^-	13^+	5^-	5^+
8310.0(12)	5^+						40(2)					
8370(4)	$7,5^+$		30(3)		18(3)							
8583.5(16)	5^+				4(1)			1.9(7)				
8591.9(10)	3^-			8(1)				3.6(6)				1.0(5)
8629(4)	7^-		38(2)		13(1)	3(1)						
8650	1^+			24(6)								
8793.2(15)	1^+			22(1)								
8926.7(28)	3^-			13(7)								
8953(3)	11^-		50(2)		26(2)	9(1)				10(2)		
9030(5)	5,7						30(5)					
9099.7(7)	7^-		47(2)		2.5(3)	7.0(5)					2.0(3)	1.2(2)
9101(4)	$7^+,9^+$		13(2)		29(2)		29(2)					
9167.0(14)	1^+								19(2)			
9267(4)	$11^+,9^+$		27(2)				18(2)			55(3)		
9280(5)	$\langle 7,9\rangle^+$				58(3)	42(3)						
9321.0(11)	1^+			3.0(3)					3.2(3)		6.8(5)	
9509(4)	$5^+,7^+$		72(3)									
9536.4(20)	5^+								15(1)		12(1)	29(2)
9575(4)	3^-			4(1)				17(2)				
9586(3)	7		30(2)		17(2)			21(2)				
9642(6)	3,5							26(6)				
9667.5(15)	3^+			5.5(5)			0.5(2)	8(1)				1.5(3)
9710(4)	$9^+,11^-$		19(3)			80(4)				1(1)		
9820.0(10)	5^-				1.0(2)			0.5(1)			4.8(3)	0.3(2)
9834(3)	11–15									100		
9874.0(18)	11^-		63(3)		4.2(10)	24(2)				2.1(8)		
9887(3)	1^+			32(2)								
9926(3)	9^+		19(1)									
10088(5)	$5^-,7^-$				19(2)							
10365(4)	7–11					100						
10411(3)	13^+		3(1)								88(1)	

Energy levels and branching ratios [95Ti07]. Part 4 **$^{19}_{9}$F**

E^*	$2J^\pi$		Branching ratios in percentage									
		E_f^*:	5337	5418	5463.5	5500.7	5535	5621	5938	6070	6088	6100
[keV]		$2J_f^\pi$:	$1^{\langle+\rangle}$	7^-	7^+	3^+	5^+	5^-	1^+	7^+	3^-	9^-
8137.7(12)	1^+								9.2(5)			
8583.5(16)	5^+			4(1)	1.9(5)			2.1(5)	1.7(5)			
8591.9(10)	3^-					1.5(5)						
8793.2(15)	1^+		0.5(1)						1.8(2)		1.7(2)	
8953(3)	11^-			5(1)								

(continued) **$^{19}_{9}$F**

E^*	$2J^\pi$					Branching ratios in percentage					
		E_f^*:	5337	5418	5463.5	5500.7	5535	5621	5938	6070	6088	6100
[keV]		$2J_f^\pi$:	$1^{\langle+\rangle}$	7^-	7^+	3^+	5^+	5^-	1^+	7^+	3^-	9^-
9030(5)	5,7									26(4)		
9099.7(7)	7^-			19(2)			1.3(7)	3.3(3)				12(1)
9101(4)	7^+,9^+									18(2)		
9575(4)	3^-										38(2)	
9667.5(15)	3^+		1.0(2)									
9820.0(10)	5^-			10(1)			0.6(2)	0.7(2)				
9874.0(18)	11^-											3.8(8)
9887(3)	1^+								4(1)		13(3)	
9926(3)	9^+				10(1)					7(1)		
10088(5)	5^-,7^-			26(2)						10(1)		

Energy levels and branching ratios [95Ti07]. Part 5 **$^{19}_{9}$F**

E^*	$2J^\pi$					Branching ratios in percentage				
		E_f^*:	6160.6	6255	6282	6330	6496.7	6500.0	6527.5	6787
[keV]		$2J_f^\pi$:	7^-	1^+	5^+	7^+	3^+	11^+	3^+	3^-
8137.7(12)	1^+			3(1)						
8583.5(16)	5^+		2.4(5)							
8591.9(10)	3^-				0.6(2)					0.3(1)
8793.2(15)	1^+			0.2(1)			6(1)		2.1(2)	1.2(3)
9101(4)	7^+,9^+					12(2)				
9566(3)	3^-			23(6)						
9874.0(18)	11^-							1.9(7)		
9887(3)	1^+								16(2)	
9926(3)	9^+					8(1)		55(2)		
10411(3)	13^+							9(1)		

Energy levels and branching ratios [95Ti07]. Part 6 **$^{19}_{9}$F**

E^*	$2J^\pi$					Branching ratios in percentage					
		E_f^*:	6838.4	6926.5	6989	7262	7364	7539.6	7660.6	8014.0	8288
[keV]		$2J_f^\pi$:	5^+	7^-	1^-	3^+	1^+	5^+	3^+	5^+	13^-
8583.5(16)	5^+			0.5(3)							
8793.2(15)	1^+				0.5(1)	1.7(2)	0.6(1)		0.2(1)		
9536.4(20)	5^+							10(1)	6(1)	2(1)	
9575(4)	3^-							11(2)	4(1)		
9667.5(15)	3^+		1.0(3)					4.0(3)	3.5(3)		
9874.0(18)	11^-										1.0(3)
9887(3)	1^+								5(1)		

Energy levels and branching ratios [98Ti06]. **$^{20}_{9}$F**

E^* [keV]	J^π	T	L	σ (τ,p) μb/sr	ℓ_n	S' (d,p)	$n\ell j$	L (t,α)	C^2S (t,α)	C^2S (d,τ)	σ (d,α) μb	$T_{1/2}$ or Γ_{cm}	Ref.
0.0	2^+		2	117	2	0.054	1d5/2	0	0.026	0.24	858(18)	11.07(6) s	87Aj02
								+2	+0.362	+0.58			88Li10
656.02(3)	3^+		2	256	2	2.32	1d5/2	2	0.504	0.66	2203(29)	305(21) fs	87Aj02
822.73(3)	4^+		4	104		0.32	1g9/2	2	0.212	0.26	1508(24)	55(4) ps	87Aj02
983.59(3)	1^-					0.014	1p1/2	1	0.488	0.84	655(15)	1.36(6) ps	87Aj02
1056.848(4)	1^+		0+2	95		0.013	2s1/2	0	0.016	0.08	1261(22)	5.1(11) fs	87Aj02
								+2	+0.122	+0.25			88Li10
1309.19(3)	2^-		1	39		0.017	1p3/2	1	0.522	0.86	1290(21)	1.30(6) ps	87Aj02
1823.8(16)	5^+		4	471		0.35	1g9/2	4	0.147		3276(39)	$\leq$45 fs	87Aj02
1843.80(3)	2^-					0.007	2p3/2	1	0.283	0.69	incl	46(3) fs	87Aj02
1970.83(4)	$\langle 3^- \rangle$		3	54		0.038	1f7/2	3	0.035		770(16)	0.42(6) ps	87Aj02
2043.98(3)	2^+		2	91	2	2.32	1d5/2	0	0.008	0.01	585(16)	2.7(5) fs	87Aj02
								+2	+0.125	+0.15			88Li10
2194.30(3)	$\langle 3^+ \rangle$		2+4	292	2	0.55	1d5/2	2	0.020	0.16	1936(27)	2.9(8) fs	87Aj02
								+4	+0.049				88Li10
2864.86(10)	$\langle 3^- \rangle$		$\langle 2 \rangle$	54		0.044	1f7/2	1	0.090		962(18)	20(3) fs	87Aj02
2966.11(3)	3^+		2+4	417	2	0.38	1d3/2	2	0.022		2764(33)	3.6(8) fs	87Aj02
								+4	+0.110				88Li10
2968.0(15)	$\langle 4^- \rangle$												
3171.69(14)	$\langle 1^+ \rangle$		2	75		0.019	1d5/2	2	0.006		358(11)		87Aj02
3488.41(3)	1^+		0+2	624	0	1.20	2s1/2	2	0.013		1210(20)	8.1(5) fs	87Aj02
3526.31(4)	0^+				0	0.28	2s1/2	2	0.008		incl	3.8(4) fs	87Aj02
3586.54(3)	$\langle 1,2 \rangle^+$		2	369	2	0.038	1d3/2	2	0.037		2381(30)	0.76(4) fs	87Aj02
3589.80(4)											incl		
3669(3)													
3680.17(4)	1,2		4	137	2	0.031	1d5/2	1	0.021		1598(23)	15.4(16) fs	87Aj02
3761.0(20)	2^-,3^+		3	95				1	0.051		1303(21)		92Ch39
3965.07(4)	1^+		0+2	69	2	0.036	1d5/2	2	0.014		608(14)	4.8(15) fs	87Aj02
4082.17(4)	$\langle 1 \rangle^+$		0	103	0+2	0.13	1s1/2	2	0.011		823(16)	2.5(5) fs	87Aj02
4199.3(27)			4	126		0.083	1d3/2				2061(28)		87Aj02
4208.1(26)				incl							incl		
4277.09(4)	$\langle 1,2 \rangle^+$		4	82	2	0.087	1d5/2				1330(20)	5(3) fs	77Mo16
4312.0(26)	$\langle 0,1 \rangle^+$				0	0.20	2s1/2				incl	3.5(4) fs	77Mo16
4371.47(11)	$\langle 2^+ \rangle$					0.01					360(11)	<3 fs	77Mo16
4509(3)	1^+		3	82		0.001							92Ch39
4518(4)													
4584.6(30)						0.02	2p3/2						77Mo16
4591.72(7)				109		$\langle$<0.1$\rangle$	$\langle$1f7/2$\rangle$						92Ch39
4722(12)			4	101									92Ch39
4731.2(29)	$\langle 3^- – 5^+ \rangle$												
4744(12)			4	30									92Ch39
4764.8(27)													
4892.76(17)													
4899.4(28)													
5041.5(31)	$\langle 2 \rangle^-$		1	272									92Ch39

(continued) **$^{20}_{9}$F**

E^* [keV]	J^π	T	L	σ (τ,p) μb/sr	ℓ_n	S' (d,p)	$n\ell j$	L (t,α)	C^2S (t,α)	C^2S (d,τ)	σ (d,α) μb	$T_{1/2}$ or Γ_{cm}	Ref.
5066.8(31)	1^-–3^+				2	0.09	1d5/2						77Mo16
5130(3)	$\langle 2^-$–$4^+\rangle$												
5226.1(4)	$\langle 1,2\rangle^-$		1	363	1,3	0.09	2p3/2					0.97(76) fs	77Mo16
5255(15)													
5282.79(17)			0	105	0	0.34	2s1/2					2.3(9) fs	77Mo16
5319.17(4)	0,1,2		1	471		0.10	1d5/2					3.4(8) fs	77Mo16
5346.1(33)			2	97	2	0.06	1d5/2						77Mo16
5352(3)													
5407(3)			4	198									92Ch39
5452.1(38)			2	431									92Ch39
5457.2(32)													
5465.89(17)	$\langle 1$–$3\rangle^+$				2	0.27	1d5/2						77Mo16
5543			1	206									92Ch39
5555.34(4)	$1,2^+$		1	147		0.03						4.2(10) fs	77Mo16
5574(6)													
5588(2)													
5623.13(6)			1	201									92Ch39
5645(12)			3	98									92Ch39
5661(12)													
5710(6)				112									92Ch39
5725(10)													
5764.9(34)	$\langle 3\rangle^+$		2	867	2	0.15	1d5/2						77Mo16
5795(14)			0	223									92Ch39
5810.1(4)	$\langle 1^+\rangle$					0.18							77Mo16
5936.13(3)	2^-		1	682	1	0.43	2p3/2					<1.4 fs	77Mo16
5939.10(10)													
5951(4)													
6007(14)													
6017.78(3)	2^-				1+3	0.7+1.4						2.3(8) fs	77Mo16
6044.98(8)	0–2												
6065(14)													
6079(14)													
6095(14)													
6111(14)													
6136(14)													
6154(14)			4	201									92Ch39
6189(14)													
6213(14)			1	103									92Ch39
6251(14)													
6287(14)													
6299.1(3)													
6335(14)													
6355(14)													
6391(14)													
6413(14)													

(continued) **$^{20}_{9}$F**

E^* [keV]	J^π	T	L	σ (τ,p) μb/sr	ℓ_n	S' (d,p)	$n\ell j$	L (t,α)	C^2S (t,α)	C^2S (d,τ)	σ (d,α) μb	$T_{1/2}$ or Γ_{cm}	Ref.
6444(14)													
6458(14)													
6481(14)													
6519(3)	0^+	2	0	530									92Ch39
6578(14)													
6627.0(3)	2^-											0.31(2) keV	
6642.6(3)	$\langle 3,4\rangle$											<0.08 keV	
6647.5(4)	1^-											1.59(10) keV	
6693.4(6)	1^-											13.8(8) keV	
6766.1(9)	$\langle 2^- – 4^+\rangle$											≤0.6 keV	
6825(5)													
6857(1)	2											10(2) keV	
6905(8)													
6936(4)													
6967.8(10)	1^-											5(1) keV	
7067.0(12)	0^-											2.4(6) keV	
7080	$\langle 1^+\rangle$											24 keV	
7166(2)	$2^{\langle +\rangle}$											8(1) keV	
7232(7)													
7283(4)													
7319(8)	$\langle 1\rangle$											33 keV	
7370(20)	$\langle 1\rangle$											19 keV	
7420(20)	$\langle 2^+\rangle$											10 keV	
7495(5)	$\langle 2\rangle$											80 keV	
7655(5)	$\langle 2^+\rangle$											65 keV	
7734(6)												140 keV	
7843(11)	1^-											50(10) keV	
7985(4)	1											14(2) keV	
8050(10)	2^+	2		115									92Ch39
8062(8)													
8113(4)												195 keV	
8147(6)												15 keV	
8268(12)													
8349(4)													
8421												27 keV	
8500												140 keV	
8720												≤30 keV	
8770												76 keV	
8940												73 keV	
9010													
9200													
9520												110 keV	
9650												100 keV	
9830												33 keV	
9850												120 keV	

(continued) **$^{20}_{9}$F**

E^* [keV]	J^π	T	L	σ (τ,p) μb/sr	ℓ_n	S' (d,p)	$n\ell j$	L (t,α)	C^2S (t,α)	C^2S (d,τ)	σ (d,α) μb	$T_{1/2}$ or Γ_{cm}	Ref.
9886(10)													
9900												≤30 keV	
9929(10)													
9981(10)													
10024(10)												150 keV	
10100(50)													
10228(10)	0^-,1											≈200 keV	
10480(10)												≈10 keV	
10641(10)	1,2											70 keV	
10807(10)	0^-,1											≈310 keV	
10990												190 keV	
11045(10)												≈30 keV	
11130(10)												<25 keV	
11244(10)												<25 keV	
11287(10)													
11490(50)													
12000													
12200(10)													
12400													
12700													
13200													
13700													
14000													
				92Ch39		98Ti06			88Li10	74Mi13	76Fo16		Ref.

Additional data on this isotope can be found in [90Cl06, 76Fo16, 71Fo14].
List of reactions measured for obtaining spectroscopic information on ^{20}F can be found in [96Ra04].
Two values C^2S from proton pickup reactions (d,τ) [74Mi13] and (t,α) [88Li10] are given separately [87Aj02].

Energy levels and branching ratios [98Ti06]. Part 2 **$^{20}_{9}$F**

E^* [keV]	J^π	E_f^*: J_f^π:	Branching ratios in percentage 0.0 2^+	656 3^+	823 4^+	984 1^-	1057 1^+	1309 2^-	1843.8 2^-	1970.8 $\langle 3^- \rangle$	2044.0 2^+
656.02(3)	3^+		100								
822.73(3)	4^+		33(2)	67(2)							
983.59(3)	1^-		100								
1056.848(4)	1^+		100								
1309.19(3)	2^-		91.7(6)	2.4(4)		4.9(4)	1.0(3)				
1823.8(16)	5^+				100						
1843.80(3)	2^-		91.4(7)	6.7(6)				1.9(3)			
1970.83(4)	$\langle 3^- \rangle$		18(2)		52(3)	0.8(4)		30(3)			

(continued) **$^{20}_{9}$F**

E^*	J^π		Branching ratios in percentage								
		E^*_f:	0.0	656	823	984	1057	1309	1843.8	1970.8	2044.0
[keV]		J^π_f:	2^+	3^+	4^+	1^-	1^+	2^-	2^-	$\langle 3^- \rangle$	2^+
2043.98(3)	2^+		7.5(6)	91.8(6)				0.7(3)			
2194.30(3)	$\langle 3^+ \rangle$		47(2)		51(2)			1.8(4)			
2864.86(10)	$\langle 3^- \rangle$		38(7)	5(3)	12(5)			12(3)	7(3)	7(3)	12(5)
2966.11(3)	3^+		27(1)	12(1)	58(2)						
2968.0(15)	$\langle 4^- \rangle$				39(4)					61(4)	
3171.69(14)	$\langle 1^+ \rangle$					100					
3488.41(3)	1^+		72(3)			3.8(5)	7(3)	9(1)	7(1)		
3526.31(4)	0^+						100				
3586.54(3)	$\langle 1,2 \rangle^+$		33(2)	10(1)		4.0(4)	10(3)		0.7(3)		31(2)
3589.80(4)			83(2)	11(1)							6.1(9)
3680.17(4)	1,2		46(2)	17(2)			23(2)	4(1)	9(1)		
3965.07(4)	1^+					26(3)		59(3)	10(2)		
4082.17(4)	$\langle 1 \rangle^+$		35(2)			5(1)	50(2)				10(1)
4277.09(4)	$\langle 1,2 \rangle^+$					24(3)	57(3)				19(3)
4371.47(11)	$\langle 2^+ \rangle$					94(3)					
4509(3)	1^+			100							
4591.72(7)						60(7)	40(7)				
4892.76(17)					35(8)						
5282.79(17)			57(10)				43(10)				
5319.17(4)	0,1,2		23(3)			55(4)	4(2)	12(4)	6(2)		
5555.34(4)	$1,2^+$		31(2)	4(1)				55(2)	7(2)		
5623.13(6)			14(4)			40(5)		31(5)			16(4)
5936.13(3)	2^-		6.6(7)	29(1)		4.0(4)	0.6(1)	0.6(1)	1.2(2)	30.1(9)	1.2(2)
5939.10(10)			12(3)			24(3)			31(3)		13(3)
6017.78(3)	2^-		26.0(9)	3.3(2)		17.2(6)	0.7(1)	1.4(1)	4.6(2)	1.0(1)	0.7(1)
6044.98(8)	0–2							28(2)	55(2)		
6627.0(3)	2^-		1.9(5)	6(1)				29(2)	7(2)	43(4)	1.4(1)
6642.6(3)	$\langle 3,4 \rangle$			42(7)	23(7)						
6647.5(4)	1^-					18(4)	9(4)				59(6)

Energy levels and branching ratios [98Ti06]. Part 3 **$^{20}_{9}$F**

E^*	J^π		Branching ratios in percentage									
		E^*_f:	2194.3	2864.9	2966.1	3171.7	3488.4	3526.3	3586.5	3589.8	3680.2	3965.1	4082.2
[keV]		J^π_f:	$\langle 3^+ \rangle$	$\langle 3^- \rangle$	3^+	$\langle 1^+ \rangle$	1^+	0^+	$\langle 1,2 \rangle^+$		1,2	1^+	$\langle 1 \rangle^+$
2864.86(10)	$\langle 3^- \rangle$		7(3)										
2966.11(3)	3^+		2.4(6)										
3586.54(3)	$\langle 1,2 \rangle^+$		8.8(7)		2.6(3)								
3965.07(4)	1^+					5(2)							
4371.47(11)	$\langle 2^+ \rangle$										6(3)		
4892.76(17)			20(5)						45(8)				
5465.89(17)	$\langle 1–3 \rangle^+$			100									

(continued) **$^{20}_{9}$F**

E^*	J^π	Branching ratios in percentage										
	E_f^*:	2194.3	2864.9	2966.1	3171.7	3488.4	3526.3	3586.5	3589.8	3680.2	3965.1	4082.2
[keV]	J_f^π:	$\langle 3^+\rangle$	$\langle 3^-\rangle$	3^+	$\langle 1^+\rangle$	1^+	0^+	$\langle 1,2\rangle^+$		1,2	1^+	$\langle 1\rangle^+$
5555.34(4)	$1,2^+$		3.5(6)									
5936.13(3)	2^-	3.9(3)	1.4(2)	1.1(2)		9.6(5)		2.1(2)	1.4(3)	5.9(3)	0.7(2)	0.9(1)
5939.10(10)								19(3)				
6017.78(3)	2^-	2.9(2)	0.4(1)	8.2(3)		16.1(7)		9.7(8)	5.3(2)	0.4(1)	0.13(3)	2.0(1)
6044.98(8)	0–2					8(2)		3.1(5)			6(1)	
6627.0(3)	2^-					3(1)	7(1)					2.0(1)
6642.6(3)	$\langle 3,4\rangle$			35(9)								
6647.5(4)	1^-					14(5)						

Energy levels and branching ratios [04Fi10, 90En08, 98En04, 97Vo07]. **$^{21}_{9}$F**

E^*	$2J^\pi$	S_p^-	L	S_N	I_τ	C^2S	$T_{1/2}$ or	Ref.	Branching ratios in percentage				
									E_f^*:	0.0	280	1101	1730	1755
[keV]		eval	(d,τ)	(d,τ)	*rel.*	(d,τ)	Γ_{cm}		$2J_f^\pi$:	5^+	1^+	$\langle 1,3\rangle^-$	3^+	
0.0	5^+	2.1(5)	2	2.52	700	1.58	4.16(2) s	77En02						
279.93(6)	1^+	1.1(3)	0	0.67	80	0.86	6.1(6) ns	77En02		100				
1100.9(20)	1^-		1	3.07	580	2.05	305(55) fs	81Ma24		<1.5	100			
1730.4(1)	3^+		2	0.47	27	$\langle 0.07\rangle$	0.05(4) ps	81Ma24		82(2)	18(2)	<2.0		
1754.8(1)	$7^+,9^+$					incl	2.4(3) ps			100				
2039.8(12)	3^-		1	0.79	226	0.82	<35 fs	81Ma24		76(6)	24(6)	<6.0		
2071(2)						incl	55(21) fs			100	<6	<6		
2410(30)	$\langle 1,3\rangle^-$		1	0.04	7			81Ma24						
3459.6(1)	$\langle 3,5\rangle^+$		2	0.15	7		<0.7 ps	81Ma24		24(2)	43(3)	<10	33(2)	
3517.7(1)	$\langle 3,5\rangle^+$		2	0.15			<0.7 ps	81Ma24		52(2)			48(2)	
3638.9(1)	$3^+,5^+$							97Vo07						100
3966(5)													100	
3996(5)					7									
4064(5)														
4172(5)	$\langle 3,5\rangle^+$		2	0.13	12			81Ma24						
4451(5)														
4572.4(3)	$\langle 1$–$7\rangle^+$		2	0.25	10			81Ma24		45(2)				
4584.0(3)	$\langle 3,5\rangle^+$									100				
4669(5)														
4924(5)														
5029(5)	3^-		1	0.88	157	0.70		81Ma24						
5079(5)	$\langle 3,5\rangle^+$					incl								
5350(20)														
5486(20)														
5566(20)														
5592(20)	$\langle 3,5\rangle^+$							97Vo07						
5787(20)														
5881(20)														

(continued) **$^{21}_{9}$F**

E^*	$2J^\pi$	S_p^-	L	S_N	I_τ	C^2S	$T_{1/2}$ or	Ref.	Branching ratios in percentage				
									E_f^*:	0.0	280	1101	1730	1755
[keV]		eval	(d,τ)	(d,τ)	*rel.*	(d,τ)	Γ_{cm}		$2J_f^\pi$:	5^+	1^+	$\langle 1,3\rangle^-$	3^+	
6500	$\langle 3^+,5^+\rangle$													
7190(20)	$\langle 1,3\rangle^-$		1	0.33	40			81Ma24						
7470(20)	3^-		3	1.24	110	$\langle 0.17\rangle$		81Ma24						
7740(20)	$\langle 1,3\rangle^-$		1	0.45	37	0.93		81Ma24						
8090	$3^+,5^+$					$\approx$0.1		97Vo07						
8170(20)	$\langle 1,3\rangle^-$		1	0.47	40	0.47		81Ma24						
8560(20)	$\langle 1,3\rangle^-$		1	0.35	17			81Ma24						
8820	$3^+,5^+$							97Vo07						
9430(20)	$\langle 1,3\rangle^-$		1	0.40	23			81Ma24						
		77En02		81Ma24	81Ma24	70Ka31		Ref.						

Additional data on this isotope can be found in [97Vo07].
Parameters S_N and C^2S of proton pickup reaction are from [81Ma24, 70Ka31], approximate value of the ^{3}He-yield I_τ (in counts per channel) are from the distribution given in [81Ma24].

Energy levels and branching ratios [04Fi10, 90En08, 98En04, 97Vo07]. Part 2 **$^{21}_{9}$F**

E^*	$2J^\pi$	Branching ratios in percentage	
		E_f^*:	3639
[keV]		$2J_f^\pi$:	
4572.4(3)	$\langle 1$–$7\rangle^+$		55(2)

Energy levels and branching ratios [90En08, 98En04, 89Hu07, 88Cl04] **$^{22}_{9}$F**

E^*	J^π	$T_{1/2}$ or	Branching ratios in percentage		
			E_f^*:	0.0	71.6
[keV]		Γ_{cm}	J_f^π:	$4^+,\langle 3^+\rangle$	
0.0	$4^+,\langle 3^+\rangle$	4.23(4) s			
71.6(2)				100	
310(30)	$\langle 2,3\rangle^+$				
709.0(3)	$\langle 2,3\rangle^+$				100
1418(13)	5^+				
1627.0(3)	1^+				100
2018(13)	$\langle 2^+\rangle$				
2571.6(4)	1^+				100
2913(19)	$\langle 2,3\rangle^+$				
2990(30)					
3170(30)					
3381(20)	4^+				
3590(20)	$\langle 4,5\rangle^+$				

(continued) **$^{22}_{9}$F**

E^* [keV]	J^π	$T_{1/2}$ or Γ_{cm}	E_f^*: J_f^π:	Branching ratios in percentage 0.0 4^+,$\langle 3^+ \rangle$	71.6
3980(50)					
4200(40)					
4366(22)					
4630(30)					
4780(40)					
4883(23)					
5238(22)					
5590(40)					
5770(40)					
6600(40)					

Energy levels [90En08, 98En04]. **$^{23}_{9}$F**

E^* [keV]	$2J^\pi$	$T_{1/2}$ or Γ_{cm}
0	$\langle 3,5 \rangle^+$	2.23(14) s
2310(80)		
2930(80)		
4050(50)		
5000(60)		
6250(80)		
8180(110)		

Additional data on this isotope can be found in [02Az02, 02Az01, 02Gu08, 01Be09].