No. 20 $D_{3d}-1$ $-3m1$ (-3m1 setting)   [trigonal] (polar)

表 1   rank 0

No.	irrep.	(tag)	mul.	comp.	harmonics	(tag)	definition
1	A_{1g}	A1g	–	–	$\mathbb{Q}_0^{(h,A_{1g})}$	Qh(0,A1g,,)	C_0

表 2   rank 1

No.	irrep.	(tag)	mul.	comp.	harmonics	(tag)	definition
2	A_{2u}	A2u	–	–	$\mathbb{Q}_1^{(h,A_{2u})}$	Qh(1,A2u,,)	C_0
3	E_u	Eu	–	0	$\mathbb{Q}_{1,0}^{(h,E_u)}$	Qh(1,Eu,,0)	C_1
4	E_u	Eu	–	1	$\mathbb{Q}_{1,1}^{(h,E_u)}$	Qh(1,Eu,,1)	S_1

表 3   rank 2

No.	irrep.	(tag)	mul.	comp.	harmonics	(tag)	definition
5	A_{1g}	A1g	–	–	$\mathbb{Q}_2^{(h,A_{1g})}$	Qh(2,A1g,,)	C_0
6	E_g	Eg	1	0	$\mathbb{Q}_{2,0}^{(h,E_g,1)}$	Qh(2,Eg,1,0)	C_1
7	E_g	Eg	1	1	$\mathbb{Q}_{2,1}^{(h,E_g,1)}$	Qh(2,Eg,1,1)	S_1
8	E_g	Eg	2	0	$\mathbb{Q}_{2,0}^{(h,E_g,2)}$	Qh(2,Eg,2,0)	$-S_2$
9	E_g	Eg	2	1	$\mathbb{Q}_{2,1}^{(h,E_g,2)}$	Qh(2,Eg,2,1)	$-C_2$

表 4   rank 3

No.	irrep.	(tag)	mul.	comp.	harmonics	(tag)	definition
10	A_{1u}	A1u	–	–	$\mathbb{Q}_3^{(h,A_{1u})}$	Qh(3,A1u,,)	C_3
11	A_{2u}	A2u	1	–	$\mathbb{Q}_3^{(h,A_{2u},1)}$	Qh(3,A2u,1,)	C_0
12	A_{2u}	A2u	2	–	$\mathbb{Q}_3^{(h,A_{2u},2)}$	Qh(3,A2u,2,)	S_3
13	E_u	Eu	1	0	$\mathbb{Q}_{3,0}^{(h,E_u,1)}$	Qh(3,Eu,1,0)	C_1
14	E_u	Eu	1	1	$\mathbb{Q}_{3,1}^{(h,E_u,1)}$	Qh(3,Eu,1,1)	S_1
15	E_u	Eu	2	0	$\mathbb{Q}_{3,0}^{(h,E_u,2)}$	Qh(3,Eu,2,0)	$-S_2$
16	E_u	Eu	2	1	$\mathbb{Q}_{3,1}^{(h,E_u,2)}$	Qh(3,Eu,2,1)	$-C_2$

表 5   rank 4

No.	irrep.	(tag)	mul.	comp.	harmonics	(tag)	definition
17	A_{1g}	A1g	1	–	$\mathbb{Q}_4^{(h,A_{1g},1)}$	Qh(4,A1g,1,)	C_0
18	A_{1g}	A1g	2	–	$\mathbb{Q}_4^{(h,A_{1g},2)}$	Qh(4,A1g,2,)	S_3
19	A_{2g}	A2g	–	–	$\mathbb{Q}_4^{(h,A_{2g})}$	Qh(4,A2g,,)	C_3
20	E_g	Eg	1	0	$\mathbb{Q}_{4,0}^{(h,E_g,1)}$	Qh(4,Eg,1,0)	C_1
21	E_g	Eg	1	1	$\mathbb{Q}_{4,1}^{(h,E_g,1)}$	Qh(4,Eg,1,1)	S_1
22	E_g	Eg	2	0	$\mathbb{Q}_{4,0}^{(h,E_g,2)}$	Qh(4,Eg,2,0)	S_4
23	E_g	Eg	2	1	$\mathbb{Q}_{4,1}^{(h,E_g,2)}$	Qh(4,Eg,2,1)	$-C_4$
24	E_g	Eg	3	0	$\mathbb{Q}_{4,0}^{(h,E_g,3)}$	Qh(4,Eg,3,0)	$-S_2$
25	E_g	Eg	3	1	$\mathbb{Q}_{4,1}^{(h,E_g,3)}$	Qh(4,Eg,3,1)	$-C_2$

表6 rank 5

No.	irrep.	(tag)	mul.	comp.	harmonics	(tag)	definition
26	A_{1u}	A1u	—	—	$\mathbb{Q}_5^{(h,A_{1u})}$	Qh(5, A1u, ,)	C_3
27	A_{2u}	A2u	1	—	$\mathbb{Q}_5^{(h,A_{2u},1)}$	Qh(5, A2u, 1,)	C_0
28	A_{2u}	A2u	2	—	$\mathbb{Q}_5^{(h,A_{2u},2)}$	Qh(5, A2u, 2,)	S_3
29	E_u	Eu	1	0	$\mathbb{Q}_{5,0}^{(h,E_u,1)}$	Qh(5, Eu, 1, 0)	C_5
30	E_u	Eu	1	1	$\mathbb{Q}_{5,1}^{(h,E_u,1)}$	Qh(5, Eu, 1, 1)	$-S_5$
31	E_u	Eu	2	0	$\mathbb{Q}_{5,0}^{(h,E_u,2)}$	Qh(5, Eu, 2, 0)	C_1
32	E_u	Eu	2	1	$\mathbb{Q}_{5,1}^{(h,E_u,2)}$	Qh(5, Eu, 2, 1)	S_1
33	E_u	Eu	3	0	$\mathbb{Q}_{5,0}^{(h,E_u,3)}$	Qh(5, Eu, 3, 0)	S_4
34	E_u	Eu	3	1	$\mathbb{Q}_{5,1}^{(h,E_u,3)}$	Qh(5, Eu, 3, 1)	$-C_4$
35	E_u	Eu	4	0	$\mathbb{Q}_{5,0}^{(h,E_u,4)}$	Qh(5, Eu, 4, 0)	$-S_2$
36	E_u	Eu	4	1	$\mathbb{Q}_{5,1}^{(h,E_u,4)}$	Qh(5, Eu, 4, 1)	$-C_2$

表7 rank 6

No.	irrep.	(tag)	mul.	comp.	harmonics	(tag)	definition
37	A_{1g}	A1g	1	—	$\mathbb{Q}_6^{(h,A_{1g},1)}$	Qh(6, A1g, 1,)	C_0
38	A_{1g}	A1g	2	—	$\mathbb{Q}_6^{(h,A_{1g},2)}$	Qh(6, A1g, 2,)	C_6
39	A_{1g}	A1g	3	—	$\mathbb{Q}_6^{(h,A_{1g},3)}$	Qh(6, A1g, 3,)	S_3
40	A_{2g}	A2g	1	—	$\mathbb{Q}_6^{(h,A_{2g},1)}$	Qh(6, A2g, 1,)	S_6
41	A_{2g}	A2g	2	—	$\mathbb{Q}_6^{(h,A_{2g},2)}$	Qh(6, A2g, 2,)	C_3
42	E_g	Eg	1	0	$\mathbb{Q}_{6,0}^{(h,E_g,1)}$	Qh(6, Eg, 1, 0)	C_5
43	E_g	Eg	1	1	$\mathbb{Q}_{6,1}^{(h,E_g,1)}$	Qh(6, Eg, 1, 1)	$-S_5$
44	E_g	Eg	2	0	$\mathbb{Q}_{6,0}^{(h,E_g,2)}$	Qh(6, Eg, 2, 0)	C_1
45	E_g	Eg	2	1	$\mathbb{Q}_{6,1}^{(h,E_g,2)}$	Qh(6, Eg, 2, 1)	S_1
46	E_g	Eg	3	0	$\mathbb{Q}_{6,0}^{(h,E_g,3)}$	Qh(6, Eg, 3, 0)	S_4
47	E_g	Eg	3	1	$\mathbb{Q}_{6,1}^{(h,E_g,3)}$	Qh(6, Eg, 3, 1)	$-C_4$
48	E_g	Eg	4	0	$\mathbb{Q}_{6,0}^{(h,E_g,4)}$	Qh(6, Eg, 4, 0)	$-S_2$
49	E_g	Eg	4	1	$\mathbb{Q}_{6,1}^{(h,E_g,4)}$	Qh(6, Eg, 4, 1)	$-C_2$

表 8 rank 7

No.	irrep.	(tag)	mul.	comp.	harmonics	(tag)	definition
50	A_{1u}	A1u	1	–	$\mathbb{Q}_7^{(h,A_{1u},1)}$	Qh(7, A1u, 1,)	S_6
51	A_{1u}	A1u	2	–	$\mathbb{Q}_7^{(h,A_{1u},2)}$	Qh(7, A1u, 2,)	C_3
52	A_{2u}	A2u	1	–	$\mathbb{Q}_7^{(h,A_{2u},1)}$	Qh(7, A2u, 1,)	C_0
53	A_{2u}	A2u	2	–	$\mathbb{Q}_7^{(h,A_{2u},2)}$	Qh(7, A2u, 2,)	C_6
54	A_{2u}	A2u	3	–	$\mathbb{Q}_7^{(h,A_{2u},3)}$	Qh(7, A2u, 3,)	S_3
55	E_u	Eu	1	0	$\mathbb{Q}_{7,0}^{(h,E_u,1)}$	Qh(7, Eu, 1, 0)	C_7
56	E_u	Eu	1	1	$\mathbb{Q}_{7,1}^{(h,E_u,1)}$	Qh(7, Eu, 1, 1)	S_7
57	E_u	Eu	2	0	$\mathbb{Q}_{7,0}^{(h,E_u,2)}$	Qh(7, Eu, 2, 0)	C_5
58	E_u	Eu	2	1	$\mathbb{Q}_{7,1}^{(h,E_u,2)}$	Qh(7, Eu, 2, 1)	$-S_5$
59	E_u	Eu	3	0	$\mathbb{Q}_{7,0}^{(h,E_u,3)}$	Qh(7, Eu, 3, 0)	C_1
60	E_u	Eu	3	1	$\mathbb{Q}_{7,1}^{(h,E_u,3)}$	Qh(7, Eu, 3, 1)	S_1
61	E_u	Eu	4	0	$\mathbb{Q}_{7,0}^{(h,E_u,4)}$	Qh(7, Eu, 4, 0)	S_4
62	E_u	Eu	4	1	$\mathbb{Q}_{7,1}^{(h,E_u,4)}$	Qh(7, Eu, 4, 1)	$-C_4$
63	E_u	Eu	5	0	$\mathbb{Q}_{7,0}^{(h,E_u,5)}$	Qh(7, Eu, 5, 0)	$-S_2$
64	E_u	Eu	5	1	$\mathbb{Q}_{7,1}^{(h,E_u,5)}$	Qh(7, Eu, 5, 1)	$-C_2$

表 9 rank 8

No.	irrep.	(tag)	mul.	comp.	harmonics	(tag)	definition
65	A_{1g}	A1g	1	–	$\mathbb{Q}_8^{(h,A_{1g},1)}$	Qh(8, A1g, 1,)	C_0
66	A_{1g}	A1g	2	–	$\mathbb{Q}_8^{(h,A_{1g},2)}$	Qh(8, A1g, 2,)	C_6
67	A_{1g}	A1g	3	–	$\mathbb{Q}_8^{(h,A_{1g},3)}$	Qh(8, A1g, 3,)	S_3
68	A_{2g}	A2g	1	–	$\mathbb{Q}_8^{(h,A_{2g},1)}$	Qh(8, A2g, 1,)	S_6
69	A_{2g}	A2g	2	–	$\mathbb{Q}_8^{(h,A_{2g},2)}$	Qh(8, A2g, 2,)	C_3
70	E_g	Eg	1	0	$\mathbb{Q}_{8,0}^{(h,E_g,1)}$	Qh(8, Eg, 1, 0)	C_7
71	E_g	Eg	1	1	$\mathbb{Q}_{8,1}^{(h,E_g,1)}$	Qh(8, Eg, 1, 1)	S_7
72	E_g	Eg	2	0	$\mathbb{Q}_{8,0}^{(h,E_g,2)}$	Qh(8, Eg, 2, 0)	C_5
73	E_g	Eg	2	1	$\mathbb{Q}_{8,1}^{(h,E_g,2)}$	Qh(8, Eg, 2, 1)	$-S_5$
74	E_g	Eg	3	0	$\mathbb{Q}_{8,0}^{(h,E_g,3)}$	Qh(8, Eg, 3, 0)	C_1
75	E_g	Eg	3	1	$\mathbb{Q}_{8,1}^{(h,E_g,3)}$	Qh(8, Eg, 3, 1)	S_1
76	E_g	Eg	4	0	$\mathbb{Q}_{8,0}^{(h,E_g,4)}$	Qh(8, Eg, 4, 0)	$-S_8$
77	E_g	Eg	4	1	$\mathbb{Q}_{8,1}^{(h,E_g,4)}$	Qh(8, Eg, 4, 1)	$-C_8$
78	E_g	Eg	5	0	$\mathbb{Q}_{8,0}^{(h,E_g,5)}$	Qh(8, Eg, 5, 0)	S_4
79	E_g	Eg	5	1	$\mathbb{Q}_{8,1}^{(h,E_g,5)}$	Qh(8, Eg, 5, 1)	$-C_4$
80	E_g	Eg	6	0	$\mathbb{Q}_{8,0}^{(h,E_g,6)}$	Qh(8, Eg, 6, 0)	$-S_2$
81	E_g	Eg	6	1	$\mathbb{Q}_{8,1}^{(h,E_g,6)}$	Qh(8, Eg, 6, 1)	$-C_2$

表 10 rank 9

No.	irrep.	(tag)	mul.	comp.	harmonics	(tag)	definition
82	A_{1u}	A1u	1	–	$\mathbb{Q}_9^{(h,A_{1u},1)}$	Qh(9, A1u, 1,)	S_6
83	A_{1u}	A1u	2	–	$\mathbb{Q}_9^{(h,A_{1u},2)}$	Qh(9, A1u, 2,)	C_9
84	A_{1u}	A1u	3	–	$\mathbb{Q}_9^{(h,A_{1u},3)}$	Qh(9, A1u, 3,)	C_3
85	A_{2u}	A2u	1	–	$\mathbb{Q}_9^{(h,A_{2u},1)}$	Qh(9, A2u, 1,)	C_0
86	A_{2u}	A2u	2	–	$\mathbb{Q}_9^{(h,A_{2u},2)}$	Qh(9, A2u, 2,)	C_6
87	A_{2u}	A2u	3	–	$\mathbb{Q}_9^{(h,A_{2u},3)}$	Qh(9, A2u, 3,)	S_9
88	A_{2u}	A2u	4	–	$\mathbb{Q}_9^{(h,A_{2u},4)}$	Qh(9, A2u, 4,)	S_3
89	E_u	Eu	1	0	$\mathbb{Q}_{9,0}^{(h,E_u,1)}$	Qh(9, Eu, 1, 0)	C_7
90	E_u	Eu	1	1	$\mathbb{Q}_{9,1}^{(h,E_u,1)}$	Qh(9, Eu, 1, 1)	S_7
91	E_u	Eu	2	0	$\mathbb{Q}_{9,0}^{(h,E_u,2)}$	Qh(9, Eu, 2, 0)	C_5
92	E_u	Eu	2	1	$\mathbb{Q}_{9,1}^{(h,E_u,2)}$	Qh(9, Eu, 2, 1)	$-S_5$
93	E_u	Eu	3	0	$\mathbb{Q}_{9,0}^{(h,E_u,3)}$	Qh(9, Eu, 3, 0)	C_1
94	E_u	Eu	3	1	$\mathbb{Q}_{9,1}^{(h,E_u,3)}$	Qh(9, Eu, 3, 1)	S_1
95	E_u	Eu	4	0	$\mathbb{Q}_{9,0}^{(h,E_u,4)}$	Qh(9, Eu, 4, 0)	$-S_8$
96	E_u	Eu	4	1	$\mathbb{Q}_{9,1}^{(h,E_u,4)}$	Qh(9, Eu, 4, 1)	$-C_8$
97	E_u	Eu	5	0	$\mathbb{Q}_{9,0}^{(h,E_u,5)}$	Qh(9, Eu, 5, 0)	S_4
98	E_u	Eu	5	1	$\mathbb{Q}_{9,1}^{(h,E_u,5)}$	Qh(9, Eu, 5, 1)	$-C_4$
99	E_u	Eu	6	0	$\mathbb{Q}_{9,0}^{(h,E_u,6)}$	Qh(9, Eu, 6, 0)	$-S_2$
100	E_u	Eu	6	1	$\mathbb{Q}_{9,1}^{(h,E_u,6)}$	Qh(9, Eu, 6, 1)	$-C_2$

表 11 rank 10

No.	irrep.	(tag)	mul.	comp.	harmonics	(tag)	definition
101	A_{1g}	A1g	1	–	$\mathbb{Q}_{10}^{(h,A_{1g},1)}$	Qh(10, A1g, 1,)	C_0
102	A_{1g}	A1g	2	–	$\mathbb{Q}_{10}^{(h,A_{1g},2)}$	Qh(10, A1g, 2,)	C_6
103	A_{1g}	A1g	3	–	$\mathbb{Q}_{10}^{(h,A_{1g},3)}$	Qh(10, A1g, 3,)	S_9
104	A_{1g}	A1g	4	–	$\mathbb{Q}_{10}^{(h,A_{1g},4)}$	Qh(10, A1g, 4,)	S_3
105	A_{2g}	A2g	1	–	$\mathbb{Q}_{10}^{(h,A_{2g},1)}$	Qh(10, A2g, 1,)	S_6
106	A_{2g}	A2g	2	–	$\mathbb{Q}_{10}^{(h,A_{2g},2)}$	Qh(10, A2g, 2,)	C_9
107	A_{2g}	A2g	3	–	$\mathbb{Q}_{10}^{(h,A_{2g},3)}$	Qh(10, A2g, 3,)	C_3
108	E_g	Eg	1	0	$\mathbb{Q}_{10,0}^{(h,E_g,1)}$	Qh(10, Eg, 1, 0)	C_7
109	E_g	Eg	1	1	$\mathbb{Q}_{10,1}^{(h,E_g,1)}$	Qh(10, Eg, 1, 1)	S_7
110	E_g	Eg	2	0	$\mathbb{Q}_{10,0}^{(h,E_g,2)}$	Qh(10, Eg, 2, 0)	C_5
111	E_g	Eg	2	1	$\mathbb{Q}_{10,1}^{(h,E_g,2)}$	Qh(10, Eg, 2, 1)	$-S_5$
112	E_g	Eg	3	0	$\mathbb{Q}_{10,0}^{(h,E_g,3)}$	Qh(10, Eg, 3, 0)	C_1
113	E_g	Eg	3	1	$\mathbb{Q}_{10,1}^{(h,E_g,3)}$	Qh(10, Eg, 3, 1)	S_1
114	E_g	Eg	4	0	$\mathbb{Q}_{10,0}^{(h,E_g,4)}$	Qh(10, Eg, 4, 0)	S_{10}
115	E_g	Eg	4	1	$\mathbb{Q}_{10,1}^{(h,E_g,4)}$	Qh(10, Eg, 4, 1)	$-C_{10}$
116	E_g	Eg	5	0	$\mathbb{Q}_{10,0}^{(h,E_g,5)}$	Qh(10, Eg, 5, 0)	$-S_8$
117	E_g	Eg	5	1	$\mathbb{Q}_{10,1}^{(h,E_g,5)}$	Qh(10, Eg, 5, 1)	$-C_8$
118	E_g	Eg	6	0	$\mathbb{Q}_{10,0}^{(h,E_g,6)}$	Qh(10, Eg, 6, 0)	S_4
119	E_g	Eg	6	1	$\mathbb{Q}_{10,1}^{(h,E_g,6)}$	Qh(10, Eg, 6, 1)	$-C_4$
120	E_g	Eg	7	0	$\mathbb{Q}_{10,0}^{(h,E_g,7)}$	Qh(10, Eg, 7, 0)	$-S_2$
121	E_g	Eg	7	1	$\mathbb{Q}_{10,1}^{(h,E_g,7)}$	Qh(10, Eg, 7, 1)	$-C_2$

表 12 rank 11

No.	irrep.	(tag)	mul.	comp.	harmonics	(tag)	definition
122	A_{1u}	A1u	1	–	$\mathbb{Q}_{11}^{(h,A_{1u},1)}$	Qh(11, A1u, 1,)	S_6
123	A_{1u}	A1u	2	–	$\mathbb{Q}_{11}^{(h,A_{1u},2)}$	Qh(11, A1u, 2,)	C_9
124	A_{1u}	A1u	3	–	$\mathbb{Q}_{11}^{(h,A_{1u},3)}$	Qh(11, A1u, 3,)	C_3
125	A_{2u}	A2u	1	–	$\mathbb{Q}_{11}^{(h,A_{2u},1)}$	Qh(11, A2u, 1,)	C_0
126	A_{2u}	A2u	2	–	$\mathbb{Q}_{11}^{(h,A_{2u},2)}$	Qh(11, A2u, 2,)	C_6
127	A_{2u}	A2u	3	–	$\mathbb{Q}_{11}^{(h,A_{2u},3)}$	Qh(11, A2u, 3,)	S_9
128	A_{2u}	A2u	4	–	$\mathbb{Q}_{11}^{(h,A_{2u},4)}$	Qh(11, A2u, 4,)	S_3
129	E_u	Eu	1	0	$\mathbb{Q}_{11,0}^{(h,E_u,1)}$	Qh(11, Eu, 1, 0)	C_{11}
130	E_u	Eu	1	1	$\mathbb{Q}_{11,1}^{(h,E_u,1)}$	Qh(11, Eu, 1, 1)	$-S_{11}$
131	E_u	Eu	2	0	$\mathbb{Q}_{11,0}^{(h,E_u,2)}$	Qh(11, Eu, 2, 0)	C_7
132	E_u	Eu	2	1	$\mathbb{Q}_{11,1}^{(h,E_u,2)}$	Qh(11, Eu, 2, 1)	S_7
133	E_u	Eu	3	0	$\mathbb{Q}_{11,0}^{(h,E_u,3)}$	Qh(11, Eu, 3, 0)	C_5
134	E_u	Eu	3	1	$\mathbb{Q}_{11,1}^{(h,E_u,3)}$	Qh(11, Eu, 3, 1)	$-S_5$
135	E_u	Eu	4	0	$\mathbb{Q}_{11,0}^{(h,E_u,4)}$	Qh(11, Eu, 4, 0)	C_1
136	E_u	Eu	4	1	$\mathbb{Q}_{11,1}^{(h,E_u,4)}$	Qh(11, Eu, 4, 1)	S_1
137	E_u	Eu	5	0	$\mathbb{Q}_{11,0}^{(h,E_u,5)}$	Qh(11, Eu, 5, 0)	S_{10}
138	E_u	Eu	5	1	$\mathbb{Q}_{11,1}^{(h,E_u,5)}$	Qh(11, Eu, 5, 1)	$-C_{10}$
139	E_u	Eu	6	0	$\mathbb{Q}_{11,0}^{(h,E_u,6)}$	Qh(11, Eu, 6, 0)	$-S_8$
140	E_u	Eu	6	1	$\mathbb{Q}_{11,1}^{(h,E_u,6)}$	Qh(11, Eu, 6, 1)	$-C_8$
141	E_u	Eu	7	0	$\mathbb{Q}_{11,0}^{(h,E_u,7)}$	Qh(11, Eu, 7, 0)	S_4
142	E_u	Eu	7	1	$\mathbb{Q}_{11,1}^{(h,E_u,7)}$	Qh(11, Eu, 7, 1)	$-C_4$
143	E_u	Eu	8	0	$\mathbb{Q}_{11,0}^{(h,E_u,8)}$	Qh(11, Eu, 8, 0)	$-S_2$
144	E_u	Eu	8	1	$\mathbb{Q}_{11,1}^{(h,E_u,8)}$	Qh(11, Eu, 8, 1)	$-C_2$