Coordinates, onsite energies and hopping matrices

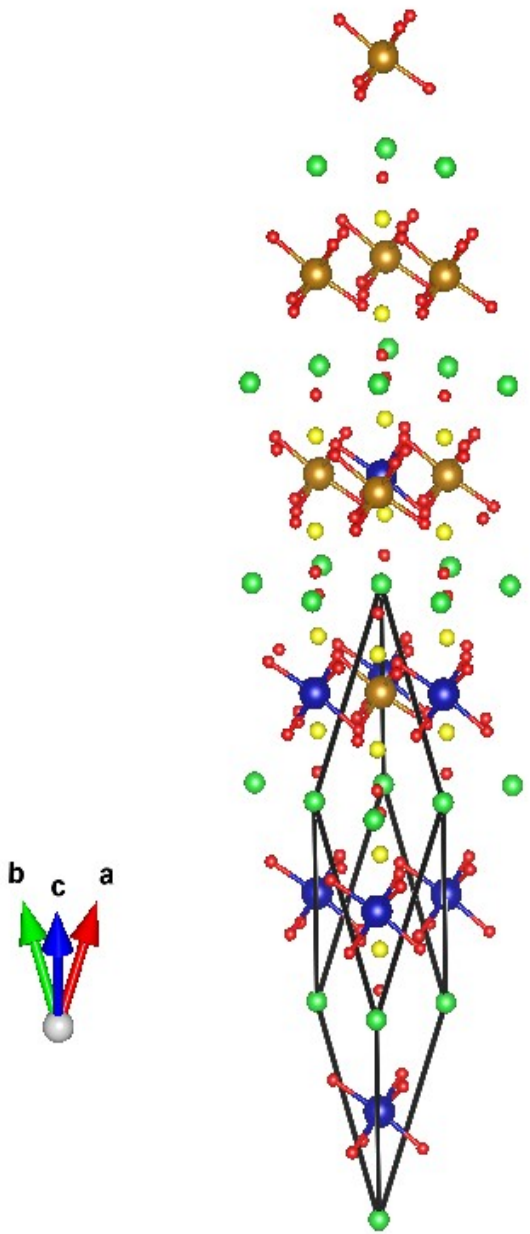
$BaCo_2(PO_4)_2$

9.2.2021

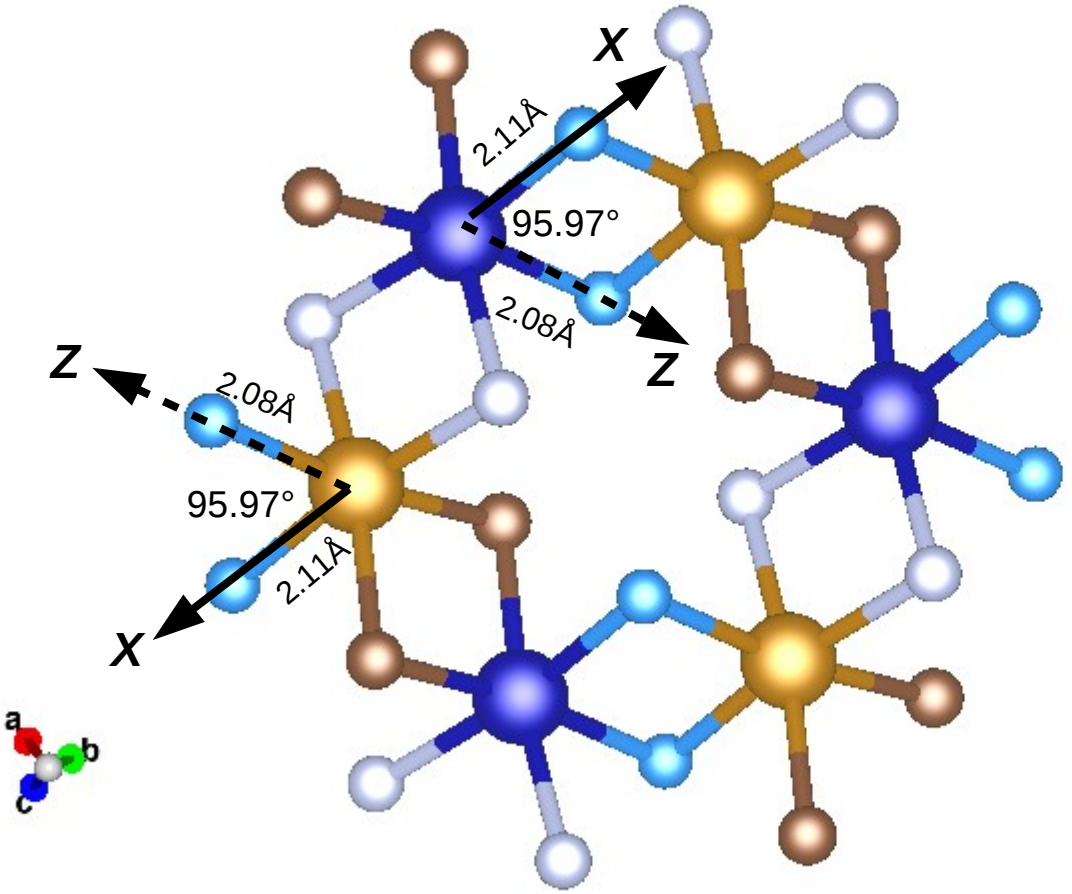
Coordinate_$BaCo_2(PO_4)_2$

Space group: *R-3* (148)

Rhombohedral cell



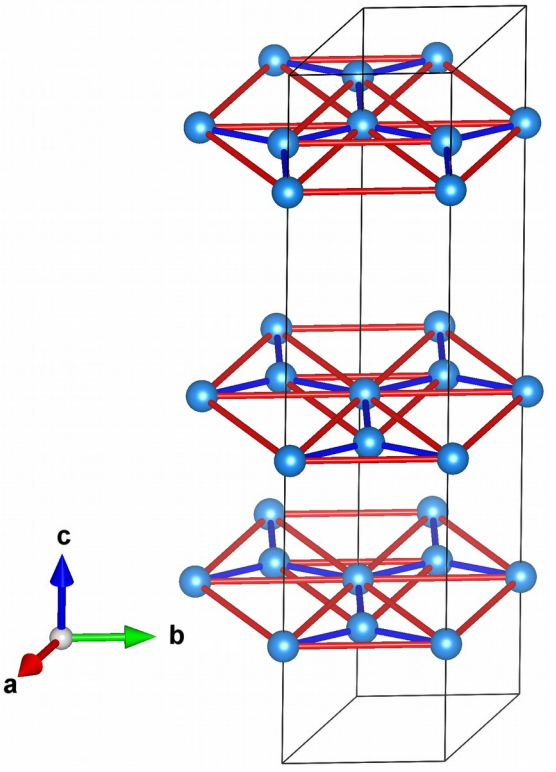
Co1
Co2
Ba
P



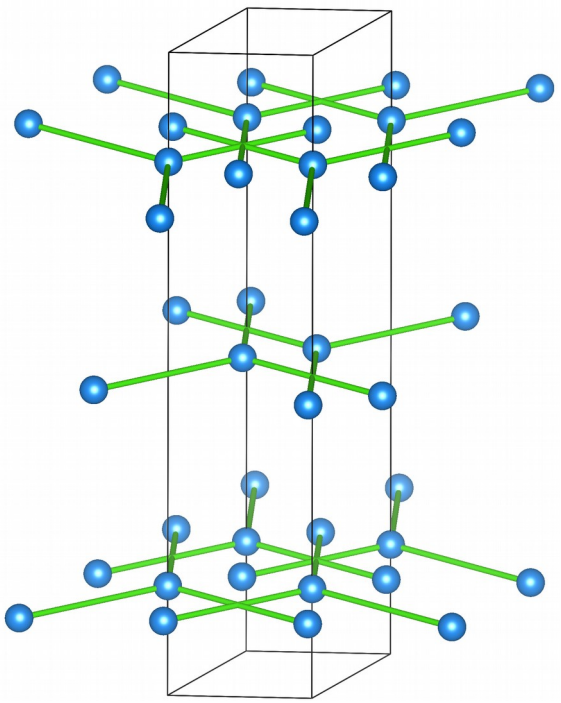
$BaCo_2(PO_4)_2$ Co-Co neighbors

Co-Co Bond-length (Å)	Numbers
2.8081	3
4.8554	6
5.6090	3
7.4186	6

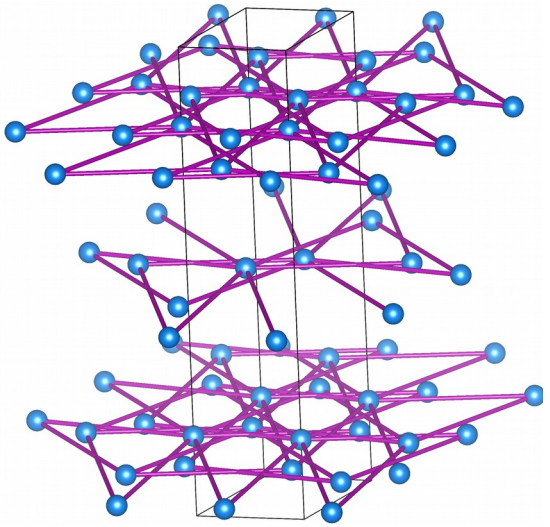
Nearest neighbor & next nearest neighbor



5.6090Å



7.4186Å



Onsite energies eV

Co1

	dxy	dyz	d3z^2-1	dxz	dx^2-y^2
dxy	-3.4155	0.0008	0.0157	0.0017	-0.0900
dyz	0.0008	-3.5049	0.0008	-0.0717	0.0034
d3z^2-1	0.0157	0.0008	-3.1860	0.0249	0.5051
dxz	0.0017	-0.0717	0.0249	-2.2912	-0.0136
dx^2-y^2	-0.0900	0.0034	0.5051	-0.0136	-2.5757

Co2

	dxy	dyz	d3z^2-1	dxz	dx^2-y^2
dxy	-3.4155	-0.0008	-0.0157	0.0017	0.0900
dyz	-0.0008	-3.5049	0.0008	0.0717	0.0034
d3z^2-1	-0.0157	0.0008	-3.1860	-0.0249	0.5051
dxz	0.0017	0.0717	-0.0249	-2.2912	0.0136
dx^2-y^2	0.0900	0.0034	0.5051	0.0136	-2.5757

3-6-4.out_rotation

Co2-Co1 & Co1-Co2 hopping matrices (H1) eV unit

Co-Co Bond length: 2.8081 (Å) **Numbers: 3** **Hopping matrix: H1**

Co2-Co1

|Int.bet. Co1- 3/Co1- 2
|Dist=1.0017 Trans. vecs. : 0 0 1
|Connecting vector: -0.500-0.866-0.059

	dxy	dyz	d3z^2-1	dxz	dx^2-y^2
dxy	-0.0363	0.0024	0.0519	-0.0106	0.0057
dyz	-0.0024	0.1162	0.0031	0.0458	-0.0152
d3z^2-1	-0.0519	0.0031	-0.2813	0.0216	0.1553
dxz	-0.0106	-0.0458	-0.0217	0.0748	0.0078
dx^2-y^2	-0.0057	-0.0152	0.1553	-0.0078	-0.1642

|Int.bet. Co1- 3/Co1- 2
|Dist=1.0017 Trans. vecs. : 0 1 0
|Connecting vector: -0.500 0.866-0.059

	dxy	dyz	d3z^2-1	dxz	dx^2-y^2
dxy	0.1217	0.2215	0.0096	0.0265	-0.0213
dyz	-0.2215	-0.1827	-0.0315	0.0309	0.0908
d3z^2-1	-0.0096	-0.0315	0.0161	-0.0059	-0.0761
dxz	0.0265	-0.0309	0.0059	0.0711	0.0043
dx^2-y^2	0.0213	0.0908	-0.0761	-0.0043	-0.0084

|Int.bet. Co1- 3/Co1- 2
|Dist=1.0017 Trans. vecs. : 1 0 0
|Connecting vector: 1.000 0.000-0.059

	dxy	dyz	d3z^2-1	dxz	dx^2-y^2
dxy	0.0987	-0.2255	0.0194	-0.0309	0.0137
dyz	0.2255	-0.2091	0.0435	-0.0040	-0.0496
d3z^2-1	-0.0194	0.0435	-0.0103	0.0031	-0.0874
dxz	-0.0309	0.0040	-0.0031	0.0612	0.0033
dx^2-y^2	-0.0137	-0.0496	-0.0874	-0.0033	0.0115

Co1-Co2

Int.bet. Co1- 2/Co1- 3
|Dist=1.0017 Trans. vecs. : 0 0-1
|Connecting vector: 0.500 0.866 0.059

	dxy	dyz	d3z^2-1	dxz	dx^2-y^2
dxy	-0.0363	-0.0024	-0.0519	-0.0106	-0.0057
dyz	0.0024	0.1162	0.0031	-0.0458	-0.0152
d3z^2-1	0.0519	0.0031	-0.2813	-0.0217	0.1553
dxz	-0.0106	0.0458	0.0216	0.0748	-0.0078
dx^2-y^2	0.0057	-0.0152	0.1553	0.0078	-0.1642

|Int.bet. Co1- 2/Co1- 3
|Dist=1.0017 Trans. vecs. : 0-1 0
|Connecting vector: 0.500-0.866 0.059

	dxy	dyz	d3z^2-1	dxz	dx^2-y^2
dxy	0.1217	-0.2215	-0.0096	0.0265	0.0213
dyz	0.2215	-0.1827	-0.0315	-0.0309	0.0908
d3z^2-1	0.0096	-0.0315	0.0161	0.0059	-0.0761
dxz	0.0265	0.0309	-0.0059	0.0711	-0.0043
dx^2-y^2	-0.0213	0.0908	-0.0761	0.0043	-0.0084

|Int.bet. Co1- 2/Co1- 3
|Dist=1.0017 Trans. vecs. :-1 0 0
|Connecting vector: -1.000 0.000 0.059

	dxy	dyz	d3z^2-1	dxz	dx^2-y^2
dxy	0.0987	0.2255	-0.0194	-0.0309	-0.0137
dyz	-0.2255	-0.2091	0.0435	0.0040	-0.0496
d3z^2-1	0.0194	0.0435	-0.0103	-0.0031	-0.0874
dxz	-0.0309	-0.0040	0.0031	0.0612	-0.0033
dx^2-y^2	0.0137	-0.0496	-0.0874	0.0033	0.0115

XY & XZ change sign

3-6-4.out_rotation

Co1-Co1 & Co2-Co2 hopping matrices (H2) eV unit

Co-Co Bond length: 4.8554 (Å) Numbers: 6 Hopping matrix: H2

Co1-Co1

|Dist=1.7321 Trans. vecs. :-1 0 1
|Connecting vector: -1.500-0.866 0.000

	dxy	dyz	d3z^2-1	dxz	dx^2-y^2
dxy	0.0021	-0.0101	-0.0299	-0.0016	0.0036
dyz	0.0030	0.0008	-0.0160	0.0247	0.0185
d3z^2-1	0.0157	0.0142	-0.0085	-0.0115	-0.0233
dxz	-0.0313	0.0173	0.0064	-0.0005	0.0055
dx^2-y^2	-0.0081	0.0183	0.0086	-0.0310	-0.0048

|Dist=1.7321 Trans. vecs. :-1 1 0
|Connecting vector: -1.500 0.866 0.000

	dxy	dyz	d3z^2-1	dxz	dx^2-y^2
dxy	-0.0114	0.0220	-0.0084	0.0191	-0.0003
dyz	-0.0239	0.0103	-0.0007	-0.0047	-0.0084
d3z^2-1	0.0066	0.0085	0.0269	0.0181	0.0136
dxz	-0.0229	-0.0096	-0.0083	0.0007	-0.0116
dx^2-y^2	-0.0058	0.0101	0.0006	0.0269	-0.0374

|Dist=1.7321 Trans. vecs. : 0-1 1
|Connecting vector: 0.000-1.732 0.000

	dxy	dyz	d3z^2-1	dxz	dx^2-y^2
dxy	0.0056	-0.0028	-0.0288	0.0106	-0.0050
dyz	0.0108	-0.0038	0.0200	0.0309	-0.0237
d3z^2-1	0.0085	-0.0216	-0.0001	0.0023	-0.0119
dxz	0.0294	0.0049	-0.0132	-0.0174	-0.0122
dx^2-y^2	0.0010	-0.0103	0.0151	0.0250	0.0047

|Dist=1.7321 Trans. vecs. : 0 1-1
|Connecting vector: 0.000 1.732 0.000

	dxy	dyz	d3z^2-1	dxz	dx^2-y^2
dxy	0.0056	0.0108	0.0085	0.0294	0.0010
dyz	-0.0028	-0.0038	-0.0216	0.0049	-0.0103
d3z^2-1	-0.0288	0.0200	-0.0001	-0.0132	0.0151
dxz	0.0106	0.0309	0.0023	-0.0174	0.0250
dx^2-y^2	-0.0050	-0.0237	-0.0119	-0.0122	0.0047

|Dist=1.7321 Trans. vecs. : 1-1 0
|Connecting vector: 1.500-0.866 0.000

	dxy	dyz	d3z^2-1	dxz	dx^2-y^2
dxy	-0.0114	-0.0239	0.0066	-0.0229	-0.0058
dyz	0.0220	0.0103	0.0085	-0.0096	0.0101
d3z^2-1	-0.0084	-0.0007	0.0269	-0.0083	0.0006
dxz	0.0191	-0.0047	0.0181	0.0007	0.0269
dx^2-y^2	-0.0003	-0.0084	0.0136	-0.0116	-0.0374

|Dist=1.7321 Trans. vecs. : 1 0-1
|Connecting vector: 1.500 0.866 0.000

	dxy	dyz	d3z^2-1	dxz	dx^2-y^2
dxy	0.0021	0.0030	0.0157	-0.0313	-0.0081
dyz	-0.0101	0.0008	0.0142	0.0173	0.0183
d3z^2-1	-0.0299	-0.0160	-0.0085	0.0064	0.0086
dxz	-0.0016	0.0247	-0.0115	-0.0005	-0.0310
dx^2-y^2	0.0036	0.0185	-0.0233	0.0055	-0.0048

XY & XZ change sign

Co2-Co2

|Dist=1.7321 Trans. vecs. : 1 0-1
|Connecting vector: 1.500 0.866 0.000

	dxy	dyz	d3z^2-1	dxz	dx^2-y^2
dxy	0.0021	0.0101	0.0299	-0.0016	-0.0036
dyz	-0.0030	0.0008	-0.0160	-0.0247	0.0185
d3z^2-1	-0.0157	0.0142	-0.0085	0.0115	-0.0233
dxz	-0.0313	-0.0173	-0.0064	-0.0005	-0.0055
dx^2-y^2	0.0081	0.0183	0.0086	0.0310	-0.0048

|Dist=1.7321 Trans. vecs. : 1-1 0
|Connecting vector: 1.500-0.866 0.000

	dxy	dyz	d3z^2-1	dxz	dx^2-y^2
dxy	-0.0114	-0.0220	0.0084	0.0191	0.0003
dyz	0.0239	0.0103	-0.0007	0.0047	-0.0084
d3z^2-1	-0.0066	0.0085	0.0269	-0.0181	0.0136
dxz	-0.0229	0.0096	0.0083	0.0007	0.0116
dx^2-y^2	0.0058	0.0101	0.0006	-0.0269	-0.0374

|Dist=1.7321 Trans. vecs. : 0 1-1
|Connecting vector: 0.000 1.732 0.000

	dxy	dyz	d3z^2-1	dxz	dx^2-y^2
dxy	0.0056	0.0028	0.0288	0.0106	0.0050
dyz	-0.0108	-0.0038	0.0200	-0.0309	-0.0237
d3z^2-1	-0.0085	-0.0216	-0.0001	-0.0023	-0.0119
dxz	0.0294	-0.0049	0.0132	-0.0174	0.0122
dx^2-y^2	-0.0010	-0.0103	0.0151	-0.0250	0.0047

|Dist=1.7321 Trans. vecs. : 0-1 1
|Connecting vector: 0.000-1.732 0.000

	dxy	dyz	d3z^2-1	dxz	dx^2-y^2
dxy	0.0056	-0.0108	-0.0085	0.0294	-0.0010
dyz	0.0028	-0.0038	-0.0216	-0.0049	-0.0103
d3z^2-1	0.0288	0.0200	-0.0001	0.0132	0.0151
dxz	0.0106	-0.0309	-0.0023	-0.0174	-0.0250
dx^2-y^2	0.0050	-0.0237	-0.0119	0.0122	0.0047

|Dist=1.7321 Trans. vecs. :-1 1 0
|Connecting vector: -1.500 0.866 0.000

	dxy	dyz	d3z^2-1	dxz	dx^2-y^2
dxy	-0.0114	0.0239	-0.0066	-0.0229	0.0058
dyz	-0.0220	0.0103	0.0085	0.0096	0.0101
d3z^2-1	0.0084	-0.0007	0.0269	0.0083	0.0006
dxz	0.0191	0.0047	-0.0181	0.0007	-0.0269
dx^2-y^2	0.0003	-0.0084	0.0136	0.0116	-0.0374

|Dist=1.7321 Trans. vecs. :-1 0 1
|Connecting vector: -1.500-0.866 0.000

	dxy	dyz	d3z^2-1	dxz	dx^2-y^2
dxy	0.0021	-0.0030	-0.0157	-0.0313	0.0081
dyz	0.0101	0.0008	0.0142	-0.0173	0.0183
d3z^2-1	0.0299	-0.0160	-0.0085	-0.0064	0.0086
dxz	-0.0016	-0.0247	0.0115	-0.0005	0.0310
dx^2-y^2	-0.0036	0.0185	-0.0233	-0.0055	-0.0048

3-6-4.out_rotation

Co2-Co1 & Co1-Co2 hopping matrices (H3) eV unit

Co-Co Bond length: 5.6090 (Å) **Numbers: 3** **Hopping matrix: H3**

Co2-Co1

|Int.bet. Co1- 3/Co1- 2
|Dist=2.0009 Trans. vecs. :-1 1 1
|Connecting vector: -2.000 0.000-0.059

	dxy	dyz	d3z^2-1	dxz	dx^2-y^2
dxy	0.0276	-0.0208	-0.0233	-0.0056	-0.0066
dyz	0.0208	-0.0118	-0.0054	0.0024	-0.0211
d3z^2-1	0.0233	-0.0054	-0.0072	-0.0348	0.0172
dxz	-0.0056	-0.0024	0.0348	-0.0038	0.0639
dx^2-y^2	0.0066	-0.0211	0.0172	-0.0639	0.1013

|Int.bet. Co1- 3/Co1- 2
|Dist=2.0009 Trans. vecs. : 1-1 1
|Connecting vector: 1.000-1.732-0.059

	dxy	dyz	d3z^2-1	dxz	dx^2-y^2
dxy	0.0342	0.0222	-0.0116	0.0292	0.0151
dyz	-0.0222	-0.0062	0.0014	0.0117	0.0200
d3z^2-1	0.0116	0.0014	0.0121	0.0358	0.0298
dxz	0.0292	-0.0117	-0.0358	-0.0059	-0.0659
dx^2-y^2	-0.0151	0.0200	0.0298	0.0659	0.0809

|Int.bet. Co1- 3/Co1- 2
|Dist=2.0009 Trans. vecs. : 1 1-1
|Connecting vector: 1.000 1.732-0.059

	dxy	dyz	d3z^2-1	dxz	dx^2-y^2
dxy	0.0197	-0.0014	-0.0042	-0.0189	0.0236
dyz	0.0014	0.0243	-0.0044	0.0360	-0.0084
d3z^2-1	0.0042	-0.0044	-0.0275	-0.0141	0.0087
dxz	-0.0189	-0.0360	0.0141	-0.1278	-0.0055
dx^2-y^2	-0.0236	-0.0084	0.0087	0.0055	-0.0463

Co1-Co2

|Int.bet. Co1- 2/Co1- 3
|Dist=2.0009 Trans. vecs. : 1-1-1
|Connecting vector: 2.000 0.000 0.059

	dxy	dyz	d3z^2-1	dxz	dx^2-y^2
dxy	0.0276	0.0208	0.0233	-0.0056	0.0066
dyz	-0.0208	-0.0118	-0.0054	-0.0024	-0.0211
d3z^2-1	-0.0233	-0.0054	-0.0072	0.0348	0.0172
dxz	-0.0056	0.0024	-0.0348	-0.0038	-0.0639
dx^2-y^2	-0.0066	-0.0211	0.0172	0.0639	0.1013

|Int.bet. Co1- 2/Co1- 3
|Dist=2.0009 Trans. vecs. :-1 1-1
|Connecting vector: -1.000 1.732 0.059

	dxy	dyz	d3z^2-1	dxz	dx^2-y^2
dxy	0.0342	-0.0222	0.0116	0.0292	-0.0151
dyz	0.0222	-0.0062	0.0014	-0.0117	0.0200
d3z^2-1	-0.0116	0.0014	0.0121	-0.0358	0.0298
dxz	0.0292	0.0117	0.0358	-0.0059	0.0659
dx^2-y^2	0.0151	0.0200	0.0298	-0.0659	0.0809

|Int.bet. Co1- 2/Co1- 3
|Dist=2.0009 Trans. vecs. :-1-1 1
|Connecting vector: -1.000-1.732 0.059

	dxy	dyz	d3z^2-1	dxz	dx^2-y^2
dxy	0.0197	0.0014	0.0042	-0.0189	-0.0236
dyz	-0.0014	0.0243	-0.0044	-0.0360	-0.0084
d3z^2-1	-0.0042	-0.0044	-0.0275	0.0141	0.0087
dxz	-0.0189	0.0360	-0.0141	-0.1278	0.0055
dx^2-y^2	0.0236	-0.0084	0.0087	-0.0055	-0.0463

XY & XZ change sign

3-6-4.out_rotation

Co2-Co1 & Co1-Co2 hopping matrices (H4) eV unit

Co-Co Bond length: 7.4186(Å) Numbers: 6 Hopping matrix: H4

Co2-Co1

|Dist=2.6464 Trans. vecs. :-1 0 2
|Connecting vector: -2.000-1.732-0.059

	dxy	dyz	d3z^2-1	dxz	dx^2-y^2
dxy	-0.0019	0.0023	0.0002	0.0011	0.0035
dyz	-0.0023	0.0013	-0.0016	-0.0001	0.0065
d3z^2-1	-0.0002	-0.0016	0.0040	0.0011	0.0004
dxz	0.0011	0.0001	-0.0011	-0.0046	0.0015
dx^2-y^2	-0.0035	0.0065	0.0004	-0.0015	-0.0055

|Dist=2.6464 Trans. vecs. :-1 2 0
|Connecting vector: -2.000 1.732-0.059

	dxy	dyz	d3z^2-1	dxz	dx^2-y^2
dxy	0.0003	0.0028	0.0005	0.0029	-0.0046
dyz	-0.0028	0.0053	-0.0042	-0.0011	0.0011
d3z^2-1	-0.0005	-0.0042	0.0017	0.0008	0.0023
dxz	0.0029	0.0011	-0.0008	0.0008	-0.0029
dx^2-y^2	0.0046	0.0011	0.0023	0.0029	-0.0036

|Dist=2.6464 Trans. vecs. : 0-1 2
|Connecting vector: -0.500-2.598-0.059

	dxy	dyz	d3z^2-1	dxz	dx^2-y^2
dxy	-0.0011	-0.0027	0.0014	0.0003	0.0006
dyz	0.0027	0.0021	0.0032	-0.0032	-0.0066
d3z^2-1	-0.0014	0.0032	0.0016	-0.0005	0.0009
dxz	0.0003	0.0032	0.0005	-0.0025	0.0003
dx^2-y^2	-0.0006	-0.0066	0.0009	-0.0003	-0.0051

|Dist=2.6464 Trans. vecs. : 0 2-1
|Connecting vector: -0.500 2.598-0.059

	dxy	dyz	d3z^2-1	dxz	dx^2-y^2
dxy	-0.0027	-0.0010	-0.0033	0.0009	-0.0012
dyz	0.0010	-0.0025	0.0045	-0.0032	0.0004
d3z^2-1	0.0033	0.0045	0.0009	0.0053	-0.0030
dxz	0.0009	0.0032	-0.0053	0.0002	-0.0011
dx^2-y^2	0.0012	0.0004	-0.0030	0.0011	0.0052

|Dist=2.6464 Trans. vecs. : 2-1 0
|Connecting vector: 2.500-0.866-0.059

	dxy	dyz	d3z^2-1	dxz	dx^2-y^2
dxy	0.0007	-0.0021	0.0008	-0.0064	-0.0030
dyz	0.0021	0.0070	0.0014	-0.0003	-0.0003
d3z^2-1	-0.0008	0.0014	0.0015	-0.0008	0.0026
dxz	-0.0064	0.0003	0.0008	0.0019	0.0035
dx^2-y^2	0.0030	-0.0003	0.0026	-0.0035	0.0003

|Dist=2.6464 Trans. vecs. : 2 0-1
|Connecting vector: 2.500 0.866-0.059

	dxy	dyz	d3z^2-1	dxz	dx^2-y^2
dxy	-0.0040	0.0005	-0.0031	0.0001	0.0001
dyz	-0.0005	-0.0065	-0.0019	-0.0041	0.0004
d3z^2-1	0.0031	-0.0019	0.0048	-0.0042	-0.0015
dxz	0.0001	0.0041	0.0042	0.0021	-0.0004
dx^2-y^2	-0.0001	0.0004	-0.0015	0.0004	0.0021

XY & XZ change sign

Co1-Co2

|Dist=2.6464 Trans. vecs. : 1 0-2
|Connecting vector: 2.000 1.732 0.059

	dxy	dyz	d3z^2-1	dxz	dx^2-y^2
dxy	-0.0019	-0.0023	-0.0002	0.0011	-0.0035
dyz	0.0023	0.0013	-0.0016	0.0001	0.0065
d3z^2-1	0.0002	-0.0016	0.0040	-0.0011	0.0004
dxz	0.0011	-0.0001	0.0011	-0.0046	-0.0015
dx^2-y^2	0.0035	0.0065	0.0004	0.0015	-0.0055

Dist=2.6464 Trans. vecs. : 1-2 0
|Connecting vector: 2.000-1.732 0.059

	dxy	dyz	d3z^2-1	dxz	dx^2-y^2
dxy	0.0003	-0.0028	-0.0005	0.0029	0.0046
dyz	0.0028	0.0053	-0.0042	0.0011	0.0011
d3z^2-1	0.0005	-0.0042	0.0017	-0.0008	0.0023
dxz	0.0029	-0.0011	0.0008	0.0008	0.0029
dx^2-y^2	-0.0046	0.0011	0.0023	-0.0029	-0.0036

|Dist=2.6464 Trans. vecs. : 0 1-2
|Connecting vector: 0.500 2.598 0.059

	dxy	dyz	d3z^2-1	dxz	dx^2-y^2
dxy	-0.0011	0.0027	-0.0014	0.0003	-0.0006
dyz	-0.0027	0.0021	0.0032	0.0032	-0.0066
d3z^2-1	0.0014	0.0032	0.0016	0.0005	0.0009
dxz	0.0003	-0.0032	-0.0005	-0.0025	-0.0003
dx^2-y^2	0.0006	-0.0066	0.0009	0.0003	-0.0051

|Dist=2.6464 Trans. vecs. : 0-2 1
|Connecting vector: 0.500-2.598 0.059

	dxy	dyz	d3z^2-1	dxz	dx^2-y^2
dxy	-0.0027	0.0010	0.0033	0.0009	0.0012
dyz	-0.0010	-0.0025	0.0045	0.0032	0.0004
d3z^2-1	-0.0033	0.0045	0.0009	-0.0053	-0.0030
dxz	0.0009	-0.0032	0.0053	0.0002	0.0011
dx^2-y^2	-0.0012	0.0004	-0.0030	-0.0011	0.0052

|Dist=2.6464 Trans. vecs. :-2 1 0
|Connecting vector: -2.500 0.866 0.059

	dxy	dyz	d3z^2-1	dxz	dx^2-y^2
dxy	0.0007	0.0021	-0.0008	-0.0064	0.0030
dyz	-0.0021	0.0070	0.0014	0.0003	-0.0003
d3z^2-1	0.0008	0.0014	0.0015	0.0008	0.0026
dxz	-0.0064	-0.0003	-0.0008	0.0019	-0.0035
dx^2-y^2	-0.0030	-0.0003	0.0026	0.0035	0.0003

|Dist=2.6464 Trans. vecs. :-2 0 1
|Connecting vector: -2.500-0.866 0.059

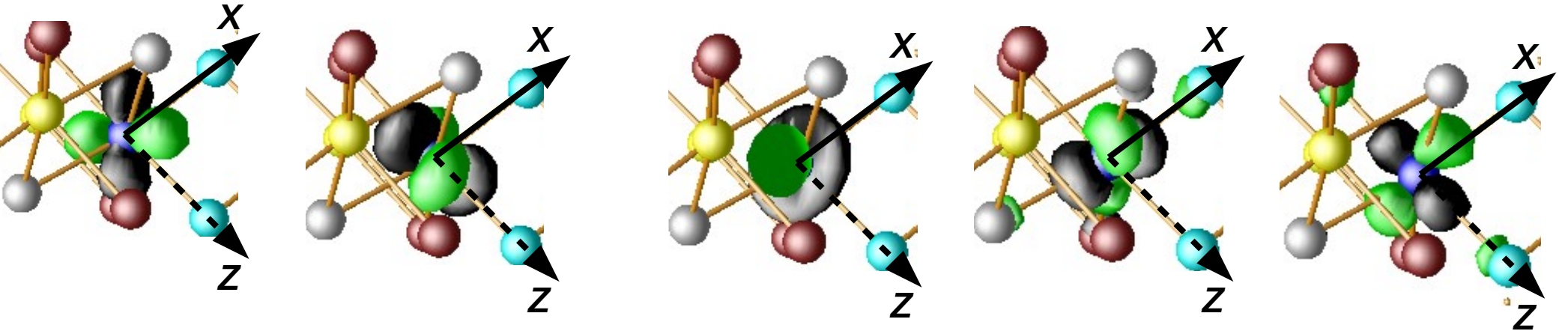
	dxy	dyz	d3z^2-1	dxz	dx^2-y^2
dxy	-0.0040	-0.0005	0.0031	0.0001	-0.0001
dyz	0.0005	-0.0065	-0.0019	0.0041	0.0004
d3z^2-1	-0.0031	-0.0019	0.0048	0.0042	-0.0015
dxz	0.0001	-0.0041	-0.0042	0.0021	0.0004
dx^2-y^2	0.0001	0.0004	-0.0015	-0.0004	0.0021

Wannier plots

+ ve - ve

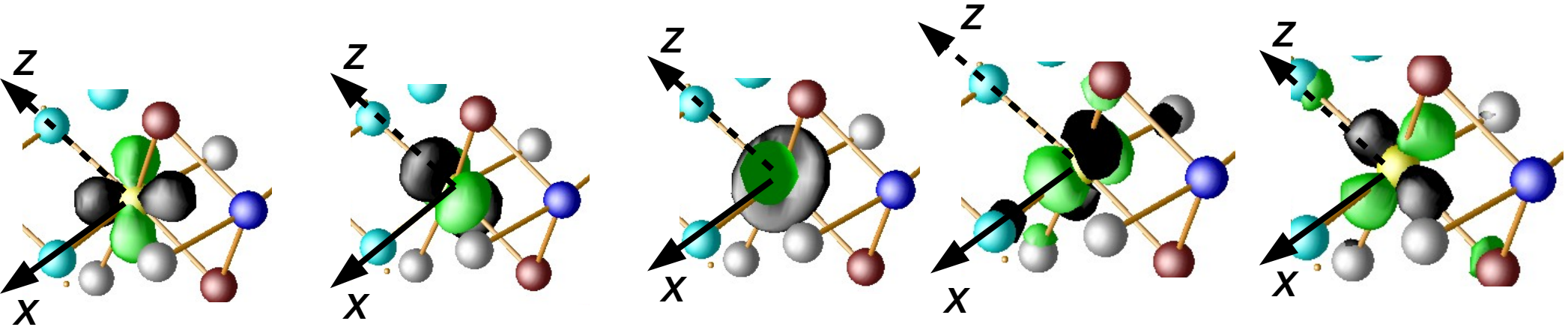
Co1

XY (m=-2) | YZ (m=-1) | Z2 (m=0) | XZ (m=1) | X2-Y2 (m=2)



Co2

XY (m=-2) | YZ (m=-1) | Z2 (m=0) | XZ (m=1) | X2-Y2 (m=2)



XY & XZ change sign