Coordinates, onsite energies, hopping matrices & wannier plots

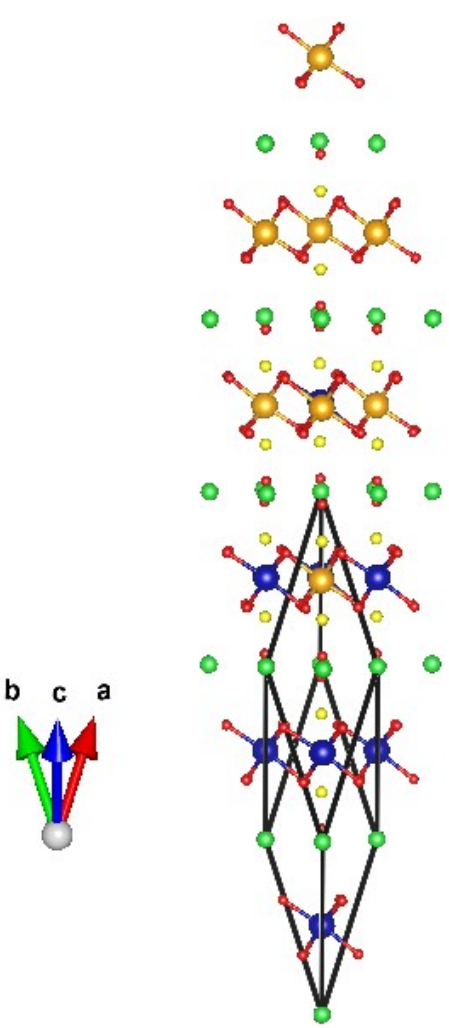
$BaCo_2(AsO_4)_2$

31.1.2021

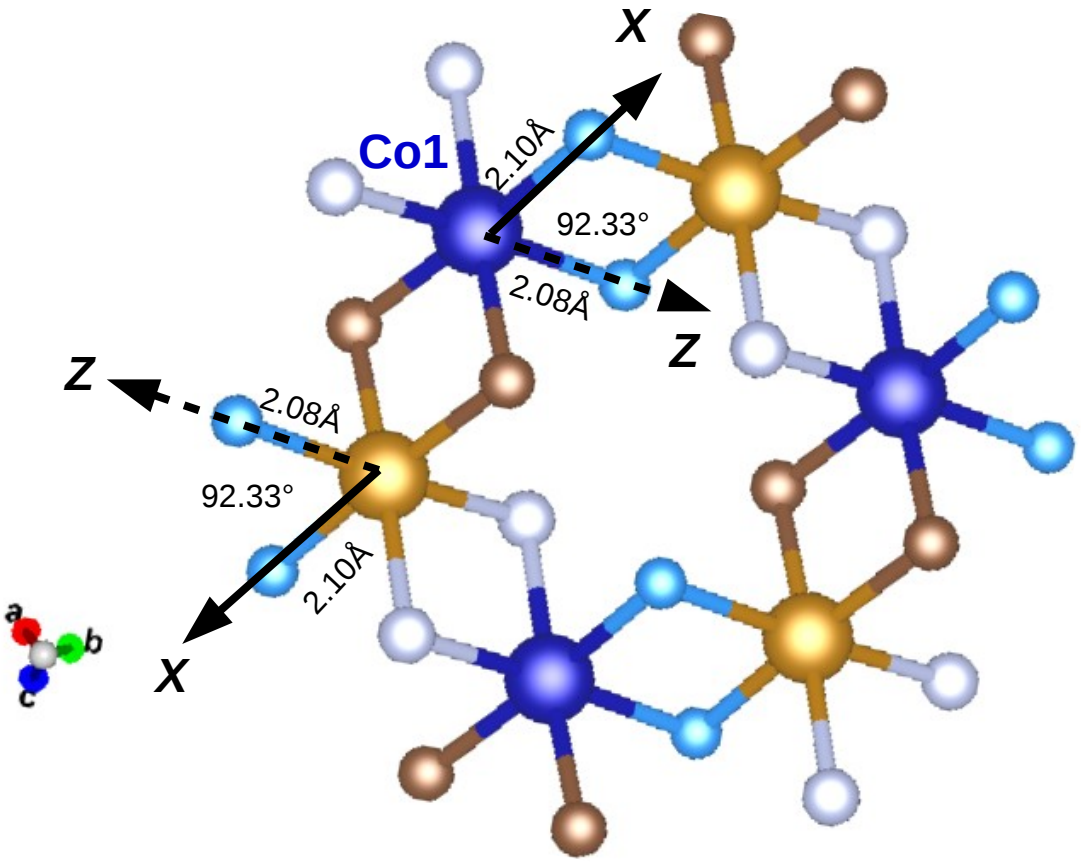
Coordinate_$BaCo_2(AsO_4)_2$

Space group: *R-3* (148)

Rhombohedral cell



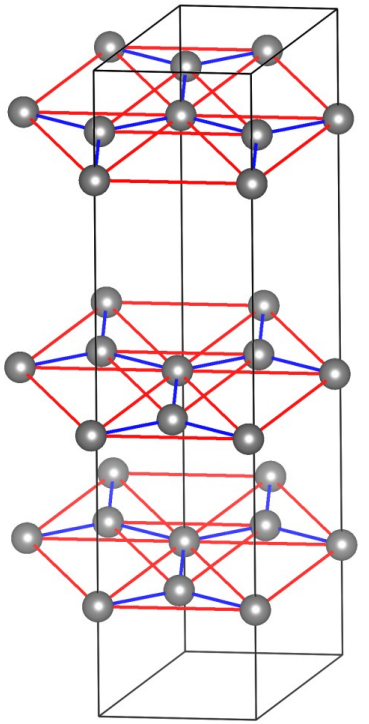
Co1
Co2
Ba
As

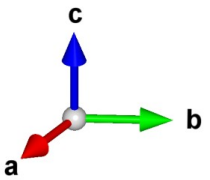


$BaCo_2(AsO_4)_2$ Co-Co neighbors

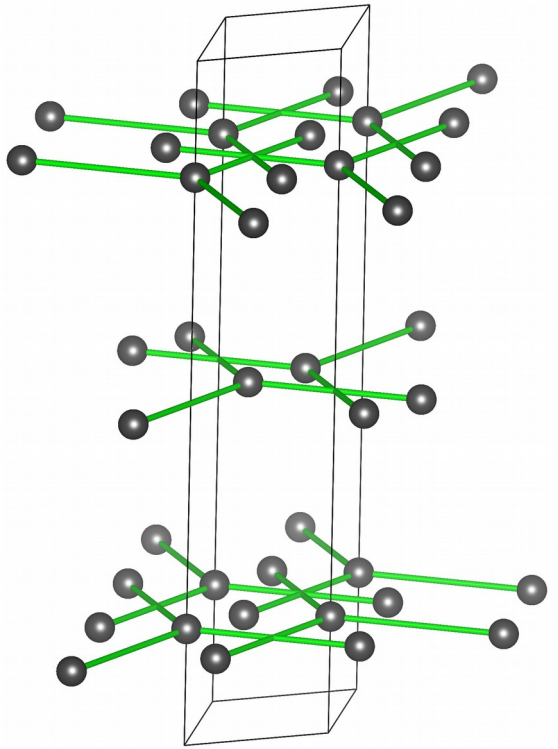
Nearest neighbor & next nearest neighbor

Co-Co Bond-length (Å)	Numbers
2.895	3
5.007	6
5.784	3
7.650	6

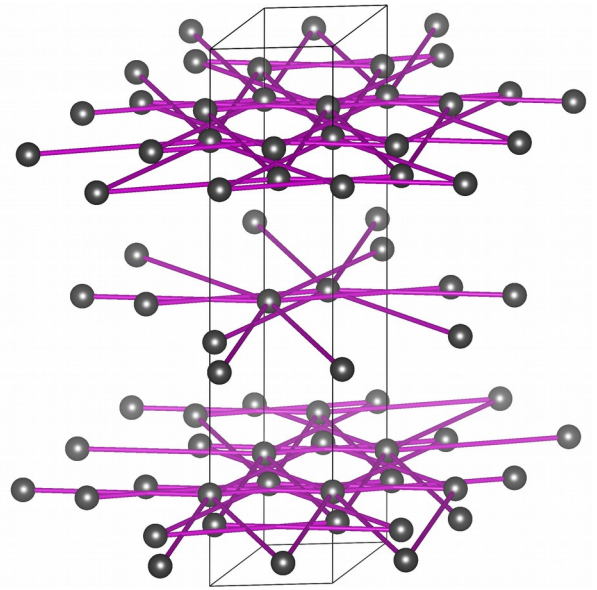




5.784Å



7.650Å



Onsite energies eV

Co1

	dxy	dyz	d3z^2-1	dxz	dx^2-y^2
dxy	-2.8610	-0.0005	-0.0495	0.0124	0.0490
dyz	-0.0005	-2.9578	0.0123	0.0140	0.0202
d3z^2-1	-0.0495	0.0123	-2.6055	-0.0043	0.5312
dxz	0.0124	0.0140	-0.0043	-1.6838	0.0020
dx^2-y^2	0.0490	0.0202	0.5312	0.0020	-1.9904

Co2

	dxy	dyz	d3z^2-1	dxz	dx^2-y^2
dxy	-2.8610	0.0005	0.0495	0.0124	-0.0490
dyz	0.0005	-2.9578	0.0123	-0.0140	0.0202
d3z^2-1	0.0495	0.0123	-2.6055	0.0043	0.5312
dxz	0.0124	-0.0140	0.0043	-1.6838	-0.0020
dx^2-y^2	-0.0490	0.0202	0.5312	-0.0020	-1.9904

3-6-4.out_rotation

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

Co-Co Bond length: 2.895 (Å) **Numbers:** 3 **Hopping matrix: H1**

Co2-Co1

Int.bet. Co1- 3/Co1- 2
Dist=1.0016 Trans. vecs. : 0 0 1
Connecting vector: -0.500-0.866-0.056

	dxy	dyz	d3z^2-1	dxz	dx^2-y^2
dxy	0.0883	0.1892	-0.0012	-0.0676	0.0240
dyz	-0.1892	-0.1539	0.0095	0.0133	-0.0808
d3z^2-1	0.0012	0.0095	0.0176	-0.0115	-0.0560
dxz	-0.0676	-0.0133	0.0115	0.0250	-0.0087
dx^2-y^2	-0.0240	-0.0808	-0.0560	0.0087	0.0292

Int.bet. Co1- 3/Co1- 2
Dist=1.0016 Trans. vecs. : 0 1 0
Connecting vector: -0.500 0.866-0.056

	dxy	dyz	d3z^2-1	dxz	dx^2-y^2
dxy	0.0849	-0.1913	-0.0034	0.0711	0.0005
dyz	0.1913	-0.1581	-0.0147	0.0391	0.0531
d3z^2-1	0.0034	-0.0147	0.0038	0.0034	-0.0649
dxz	0.0711	-0.0391	-0.0034	0.0226	0.0043
dx^2-y^2	-0.0005	0.0531	-0.0649	-0.0043	0.0416

Int.bet. Co1- 3/Co1- 2
Dist=1.0016 Trans. vecs. : 1 0 0
Connecting vector: 1.000 0.000-0.056

	dxy	dyz	d3z^2-1	dxz	dx^2-y^2
dxy	-0.0442	0.0009	-0.0476	0.0076	0.0052
dyz	-0.0009	0.0961	-0.0033	-0.0558	0.0123
d3z^2-1	0.0476	-0.0033	-0.1699	0.0221	0.1650
dxz	0.0076	0.0558	-0.0221	0.0240	0.0129
dx^2-y^2	-0.0052	0.0123	0.1650	-0.0129	-0.1668

Co1-Co2

Int.bet. Co1- 2/Co1- 3
Dist=1.0016 Trans. vecs. : 0 0-1
Connecting vector: 0.500 0.866 0.056

	dxy	dyz	d3z^2-1	dxz	dx^2-y^2
dxy	0.0883	-0.1892	0.0012	-0.0676	-0.0240
dyz	0.1892	-0.1539	0.0095	-0.0133	-0.0808
d3z^2-1	-0.0012	0.0095	0.0176	0.0115	-0.0560
dxz	-0.0676	0.0133	-0.0115	0.0250	0.0087
dx^2-y^2	0.0240	-0.0808	-0.0560	-0.0087	0.0292

Int.bet. Co1- 2/Co1- 3
Dist=1.0016 Trans. vecs. : 0-1 0
Connecting vector: 0.500-0.866 0.056

	dxy	dyz	d3z^2-1	dxz	dx^2-y^2
dxy	0.0849	0.1913	0.0034	0.0711	-0.0005
dyz	-0.1913	-0.1581	-0.0147	-0.0391	0.0531
d3z^2-1	-0.0034	-0.0147	0.0038	-0.0034	-0.0649
dxz	0.0711	0.0391	0.0034	0.0226	-0.0043
dx^2-y^2	0.0005	0.0531	-0.0649	0.0043	0.0416

Int.bet. Co1- 2/Co1- 3
Dist=1.0016 Trans. vecs. :-1 0 0
Connecting vector: -1.000 0.000 0.056

	dxy	dyz	d3z^2-1	dxz	dx^2-y^2
dxy	-0.0442	-0.0009	0.0476	0.0076	-0.0052
dyz	0.0009	0.0961	-0.0033	0.0558	0.0123
d3z^2-1	-0.0476	-0.0033	-0.1699	-0.0221	0.1650
dxz	0.0076	-0.0558	0.0221	0.0240	-0.0129
dx^2-y^2	0.0052	0.0123	0.1650	0.0129	-0.1668

XY & XZ change sign

3-6-4.out_rotation

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

Co-Co Bond length:5.007(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	0.0034	0.0012	0.0082	-0.0364	0.0053
dyz	-0.0009	0.0003	0.0111	-0.0081	0.0097
d3z^2-1	0.0259	-0.0195	0.0058	-0.0202	0.0095
dxz	-0.0165	-0.0337	0.0090	0.0014	0.0084
dx^2-y^2	-0.0010	0.0355	-0.0133	-0.0134	0.0094

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	0.0064	0.0100	0.0026	0.0367	0.0103
dyz	-0.0046	0.0032	-0.0069	-0.0170	-0.0149
d3z^2-1	0.0300	0.0171	-0.0043	0.0180	0.0079
dxz	0.0114	-0.0300	-0.0139	0.0107	-0.0110
dx^2-y^2	-0.0055	-0.0298	-0.0177	0.0078	0.0043

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	-0.0153	0.0177	0.0051	-0.0071	-0.0002
dyz	-0.0228	0.0253	0.0042	0.0073	0.0173
d3z^2-1	-0.0067	-0.0063	0.0368	0.0135	0.0255
dxz	0.0111	0.0071	-0.0071	0.0011	-0.0085
dx^2-y^2	0.0030	-0.0202	0.0177	0.0185	-0.0277

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	-0.0153	-0.0228	-0.0067	0.0111	0.0030
dyz	0.0177	0.0253	-0.0063	0.0071	-0.0202
d3z^2-1	0.0051	0.0042	0.0368	-0.0071	0.0177
dxz	-0.0071	0.0073	0.0135	0.0011	0.0185
dx^2-y^2	-0.0002	0.0173	0.0255	-0.0085	-0.0277

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	0.0064	-0.0046	0.0300	0.0114	-0.0055
dyz	0.0100	0.0032	0.0171	-0.0300	-0.0298
d3z^2-1	0.0026	-0.0069	-0.0043	-0.0139	-0.0177
dxz	0.0367	-0.0170	0.0180	0.0107	0.0078
dx^2-y^2	0.0103	-0.0149	0.0079	-0.0110	0.0043

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	0.0034	-0.0009	0.0259	-0.0165	-0.0010
dyz	0.0012	0.0003	-0.0195	-0.0337	0.0355
d3z^2-1	0.0082	0.0111	0.0058	0.0090	-0.0133
dxz	-0.0364	-0.0081	-0.0202	0.0014	-0.0134
dx^2-y^2	0.0053	0.0097	0.0095	0.0084	0.0094

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	0.0034	-0.0012	-0.0082	-0.0364	-0.0053
dyz	0.0009	0.0003	0.0111	0.0081	0.0097
d3z^2-1	-0.0259	-0.0195	0.0058	0.0202	0.0095
dxz	-0.0165	0.0337	-0.0090	0.0014	-0.0084
dx^2-y^2	0.0010	0.0355	-0.0133	0.0134	0.0094

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	0.0064	-0.0100	-0.0026	0.0367	-0.0103
dyz	0.0046	0.0032	-0.0069	0.0170	-0.0149
d3z^2-1	-0.0300	0.0171	-0.0043	-0.0180	0.0079
dxz	0.0114	0.0300	0.0139	0.0107	0.0110
dx^2-y^2	0.0055	-0.0298	-0.0177	-0.0078	0.0043

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	-0.0153	-0.0177	-0.0051	-0.0071	0.0002
dyz	0.0228	0.0253	0.0042	-0.0073	0.0173
d3z^2-1	0.0067	-0.0063	0.0368	-0.0135	0.0255
dxz	0.0111	-0.0071	0.0071	0.0011	0.0085
dx^2-y^2	-0.0030	-0.0202	0.0177	-0.0185	-0.0277

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	-0.0153	0.0228	0.0067	0.0111	-0.0030
dyz	-0.0177	0.0253	-0.0063	-0.0071	-0.0202
d3z^2-1	-0.0051	0.0042	0.0368	0.0071	0.0177
dxz	-0.0071	-0.0073	-0.0135	0.0011	-0.0185
dx^2-y^2	0.0002	0.0173	0.0255	0.0085	-0.0277

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	0.0064	0.0046	-0.0300	0.0114	0.0055
dyz	-0.0100	0.0032	0.0171	0.0300	-0.0298
d3z^2-1	-0.0026	-0.0069	-0.0043	0.0139	-0.0177
dxz	0.0367	0.0170	-0.0180	0.0107	-0.0078
dx^2-y^2	-0.0103	-0.0149	0.0079	0.0110	0.0043

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	0.0034	0.0009	-0.0259	-0.0165	0.0010
dyz	-0.0012	0.0003	-0.0195	0.0337	0.0355
d3z^2-1	-0.0082	0.0111	0.0058	-0.0090	-0.0133
dxz	-0.0364	0.0081	0.0202	0.0014	0.0134
dx^2-y^2	-0.0053	0.0097	0.0095	-0.0084	0.0094

3-6-4.out_rotation

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

Co-Co Bond length: 5.784(Å) **Numbers:** 3 **Hopping matrix: H3**

Co2-Co1

Int.bet. Co1- 3/Co1- 2
Dist=2.0008 Trans. vecs. :-1 1 1
Connecting vector: -2.000 0.000-0.056

	dxy	dyz	d3z^2-1	dxz	dx^2-y^2
dxy	0.0027	-0.0007	0.0015	0.0134	-0.0086
dyz	0.0007	0.0061	0.0000	-0.0137	0.0077
d3z^2-1	-0.0015	0.0000	-0.0258	-0.0078	0.0149
dxz	0.0134	0.0137	0.0078	-0.1327	-0.0042
dx^2-y^2	0.0086	0.0077	0.0149	0.0042	-0.0646

Dist=2.0008 Trans. vecs. : 1-1 1
Connecting vector: 1.000-1.732-0.056

	dxy	dyz	d3z^2-1	dxz	dx^2-y^2
dxy	0.0242	-0.0243	0.0151	0.0084	0.0129
dyz	0.0243	-0.0226	0.0094	0.0107	0.0141
d3z^2-1	-0.0151	0.0094	0.0051	-0.0363	0.0260
dxz	0.0084	-0.0107	0.0363	-0.0019	0.0661
dx^2-y^2	-0.0129	0.0141	0.0260	-0.0661	0.0856

Int.bet. Co1- 3/Co1- 2
Dist=2.0008 Trans. vecs. : 1 1-1
Connecting vector: 1.000 1.732-0.056

	dxy	dyz	d3z^2-1	dxz	dx^2-y^2
dxy	0.0283	0.0255	-0.0005	-0.0298	-0.0060
dyz	-0.0255	-0.0177	-0.0026	0.0075	-0.0102
d3z^2-1	0.0005	-0.0026	0.0251	0.0377	0.0394
dxz	-0.0298	-0.0075	-0.0377	-0.0013	-0.0658
dx^2-y^2	0.0060	-0.0102	0.0394	0.0658	0.0653

Co1-Co2

Int.bet. Co1- 2/Co1- 3
Dist=2.0008 Trans. vecs. : 1-1-1
Connecting vector: 2.000 0.000 0.056

	dxy	dyz	d3z^2-1	dxz	dx^2-y^2
dxy	0.0027	0.0007	-0.0015	0.0134	0.0086
dyz	-0.0007	0.0061	0.0000	0.0137	0.0077
d3z^2-1	0.0015	0.0000	-0.0258	0.0078	0.0149
dxz	0.0134	-0.0137	-0.0078	-0.1327	0.0042
dx^2-y^2	-0.0086	0.0077	0.0149	-0.0042	-0.0646

Int.bet. Co1- 2/Co1- 3
Dist=2.0008 Trans. vecs. :-1 1-1
Connecting vector: -1.000 1.732 0.056

	dxy	dyz	d3z^2-1	dxz	dx^2-y^2
dxy	0.0242	0.0243	-0.0151	0.0084	-0.0129
dyz	-0.0243	-0.0226	0.0094	-0.0107	0.0141
d3z^2-1	0.0151	0.0094	0.0051	0.0363	0.0260
dxz	0.0084	0.0107	-0.0363	-0.0019	-0.0661
dx^2-y^2	0.0129	0.0141	0.0260	0.0661	0.0856

Int.bet. Co1- 2/Co1- 3
Dist=2.0008 Trans. vecs. :-1-1 1
Connecting vector: -1.000-1.732 0.056

	dxy	dyz	d3z^2-1	dxz	dx^2-y^2
dxy	0.0283	-0.0255	0.0005	-0.0298	0.0060
dyz	0.0255	-0.0177	-0.0026	-0.0075	-0.0102
d3z^2-1	-0.0005	-0.0026	0.0251	-0.0377	0.0394
dxz	-0.0298	0.0075	0.0377	-0.0013	0.0658
dx^2-y^2	-0.0060	-0.0102	0.0394	-0.0658	0.0653

XY & XZ change sign

3-6-4.out_rotation

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

Co-Co Bond length: 7.650(Å) Numbers: 6 Hopping matrix: H4

Co2-Co1

Dist=2.6464 Trans. vecs. :-1 0 2
Connecting vector: -2.000-1.732-0.056

	dxy	dyz	d3z^2-1	dxz	dx^2-y^2
dxy	-0.0023	0.0003	0.0049	0.0006	-0.0001
dyz	-0.0003	-0.0041	-0.0050	0.0041	0.0009
d3z^2-1	-0.0049	-0.0050	-0.0006	0.0102	-0.0030
dxz	0.0006	-0.0041	-0.0102	-0.0004	-0.0041
dx^2-y^2	0.0001	0.0009	-0.0030	0.0041	0.0090

Dist=2.6464 Trans. vecs. :-1 2 0
Connecting vector: -2.000 1.732-0.056

	dxy	dyz	d3z^2-1	dxz	dx^2-y^2
dxy	-0.0034	-0.0002	0.0048	-0.0010	-0.0014
dyz	0.0002	-0.0065	0.0032	0.0062	-0.0027
d3z^2-1	-0.0048	0.0032	0.0047	-0.0109	-0.0013
dxz	-0.0010	-0.0062	0.0109	0.0011	0.0008
dx^2-y^2	0.0014	-0.0027	-0.0013	-0.0008	0.0035

Dist=2.6464 Trans. vecs. : 0-1 2
Connecting vector: -0.500-2.598-0.056

	dxy	dyz	d3z^2-1	dxz	dx^2-y^2
dxy	0.0038	0.0038	0.0013	-0.0045	0.0083
dyz	-0.0038	0.0083	0.0050	-0.0015	0.0007
d3z^2-1	-0.0013	0.0050	0.0047	0.0012	0.0054
dxz	-0.0045	0.0015	-0.0012	0.0037	-0.0050
dx^2-y^2	-0.0083	0.0007	0.0054	0.0050	-0.0016

Dist=2.6464 Trans. vecs. : 0 2-1
Connecting vector: -0.500 2.598-0.056

	dxy	dyz	d3z^2-1	dxz	dx^2-y^2
dxy	0.0050	-0.0026	-0.0005	0.0084	0.0036
dyz	0.0026	0.0080	-0.0027	-0.0033	-0.0003
d3z^2-1	0.0005	-0.0027	0.0045	-0.0020	0.0056
dxz	0.0084	0.0033	0.0020	0.0043	0.0058
dx^2-y^2	-0.0036	-0.0003	0.0056	-0.0058	0.0038

Dist=2.6464 Trans. vecs. : 2-1 0
Connecting vector: 2.500-0.866-0.056

	dxy	dyz	d3z^2-1	dxz	dx^2-y^2
dxy	-0.0018	0.0021	-0.0002	-0.0027	-0.0052
dyz	-0.0021	0.0015	0.0019	0.0002	-0.0104
d3z^2-1	0.0002	0.0019	0.0006	-0.0002	-0.0003
dxz	-0.0027	-0.0002	0.0002	-0.0106	0.0032
dx^2-y^2	0.0052	-0.0104	-0.0003	-0.0032	-0.0075

Dist=2.6464 Trans. vecs. : 2 0-1
Connecting vector: 2.500 0.866-0.056

	dxy	dyz	d3z^2-1	dxz	dx^2-y^2
dxy	-0.0013	-0.0034	-0.0006	-0.0005	-0.0029
dyz	0.0034	0.0028	-0.0027	0.0060	0.0110
d3z^2-1	0.0006	-0.0027	0.0004	0.0021	-0.0001
dxz	-0.0005	-0.0060	-0.0021	-0.0070	-0.0002
dx^2-y^2	0.0029	0.0110	-0.0001	0.0002	-0.0076

Co1-Co2

Dist=2.6464 Trans. vecs. : 1 0-2
Connecting vector: 2.000 1.732 0.056

	dxy	dyz	d3z^2-1	dxz	dx^2-y^2
dxy	-0.0023	-0.0003	-0.0049	0.0006	0.0001
dyz	0.0003	-0.0041	-0.0050	-0.0041	0.0009
d3z^2-1	0.0049	-0.0050	-0.0006	-0.0102	-0.0030
dxz	0.0006	0.0041	0.0102	-0.0004	0.0041
dx^2-y^2	-0.0001	0.0009	-0.0030	-0.0041	0.0090

Dist=2.6464 Trans. vecs. : 1-2 0
Connecting vector: 2.000-1.732 0.056

	dxy	dyz	d3z^2-1	dxz	dx^2-y^2
dxy	-0.0034	0.0002	-0.0048	-0.0010	0.0014
dyz	-0.0002	-0.0065	0.0032	-0.0062	-0.0027
d3z^2-1	0.0048	0.0032	0.0047	0.0109	-0.0013
dxz	-0.0010	0.0062	-0.0109	0.0011	-0.0008
dx^2-y^2	-0.0014	-0.0027	-0.0013	0.0008	0.0035

Dist=2.6464 Trans. vecs. : 0 1-2
Connecting vector: 0.500 2.598 0.056

	dxy	dyz	d3z^2-1	dxz	dx^2-y^2
dxy	0.0038	-0.0038	-0.0013	-0.0045	-0.0083
dyz	0.0038	0.0083	0.0050	0.0015	0.0007
d3z^2-1	0.0013	0.0050	0.0047	-0.0012	0.0054
dxz	-0.0045	-0.0015	0.0012	0.0037	0.0050
dx^2-y^2	0.0083	0.0007	0.0054	-0.0050	-0.0016

Dist=2.6464 Trans. vecs. : 0-2 1
Connecting vector: 0.500-2.598 0.056

	dxy	dyz	d3z^2-1	dxz	dx^2-y^2
dxy	0.0050	0.0026	0.0005	0.0084	-0.0036
dyz	-0.0026	0.0080	-0.0027	0.0033	-0.0003
d3z^2-1	-0.0005	-0.0027	0.0045	0.0020	0.0056
dxz	0.0084	-0.0033	-0.0020	0.0043	-0.0058
dx^2-y^2	0.0036	-0.0003	0.0056	0.0058	0.0038

Dist=2.6464 Trans. vecs. :-2 1 0
Connecting vector: -2.500 0.866 0.056

	dxy	dyz	d3z^2-1	dxz	dx^2-y^2
dxy	-0.0018	-0.0021	0.0002	-0.0027	0.0052
dyz	0.0021	0.0015	0.0019	-0.0002	-0.0104
d3z^2-1	-0.0002	0.0019	0.0006	0.0002	-0.0003
dxz	-0.0027	0.0002	-0.0002	-0.0106	-0.0032
dx^2-y^2	-0.0052	-0.0104	-0.0003	0.0032	-0.0075

Dist=2.6464 Trans. vecs. :-2 0 1
Connecting vector: -2.500-0.866 0.056

	dxy	dyz	d3z^2-1	dxz	dx^2-y^2
dxy	-0.0013	0.0034	0.0006	-0.0005	0.0029
dyz	-0.0034	0.0028	-0.0027	-0.0060	0.0110
d3z^2-1	-0.0006	-0.0027	0.0004	-0.0021	-0.0001
dxz	-0.0005	0.0060	0.0021	-0.0070	0.0002
dx^2-y^2	-0.0029	0.0110	-0.0001	-0.0002	-0.0076

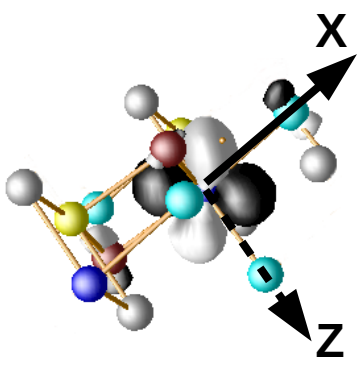
XY & XZ change sign

Wannier plot

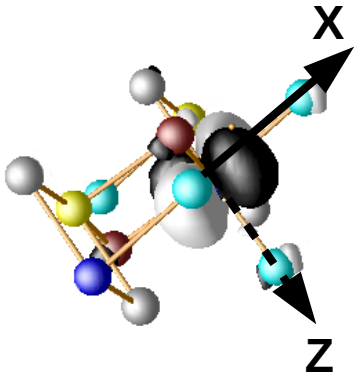
+ ve - ve

Co1

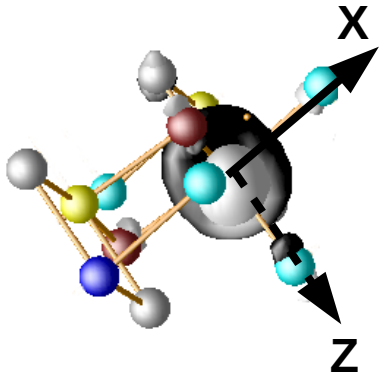
XY (m=-2)



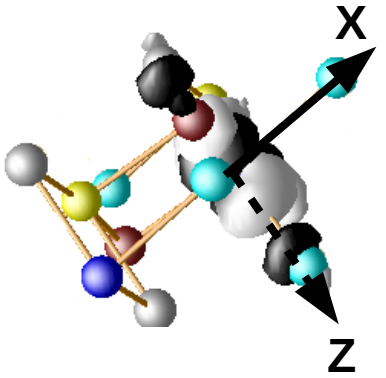
YZ (m=-1)



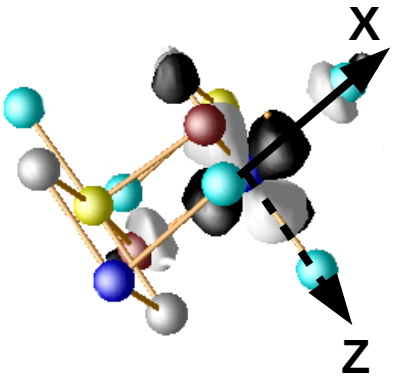
Z2 (m=0)



XZ (m=1)

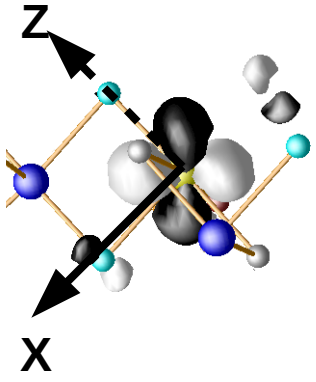


X2-Y2 (m=2)

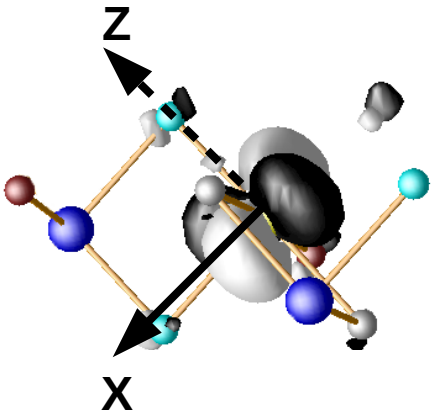


Co2

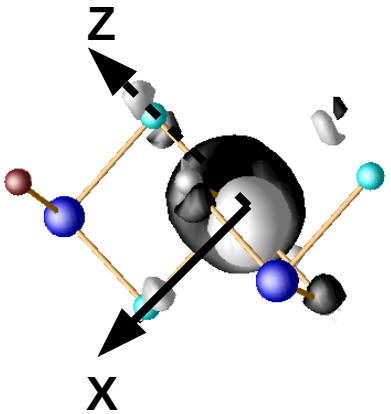
XY (m=-2)



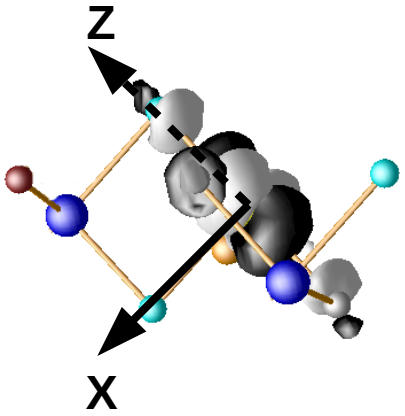
YZ (m=-1)



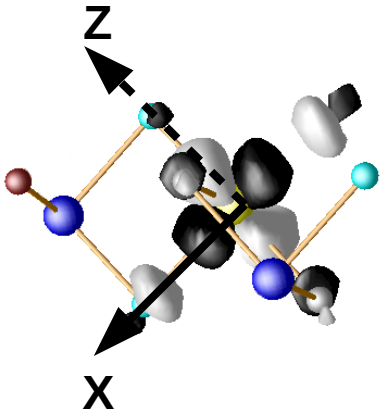
Z2 (m=0)



XZ (m=1)



X2-Y2 (m=2)



XY & XZ change sign