BEILSTEIN JOURNAL OF NANOTECHNOLOGY

Supporting Information

for

Micromagnetic modeling of the interaction of single-domain ferromagnetic particles in a nanopowder

Sergey P. Savchenko and Alexander Yu. Germov

Beilstein J. Nanotechnol. **2026,** *17,* 1596–1604. doi:10.3762/bjnano.17.109

Additional computational data

License and Terms: This is a supporting information file under the terms of the Creative Commons Attribution License (https://creativecommons.org/licenses/by/4.0). Please note that the reuse, redistribution and reproduction in particular requires that the author(s) and source are credited and that individual graphics may be subject to special legal provisions.
The license is subject to the *Beilstein Journal of Nanotechnology* terms and conditions: (https://www.beilstein-journals.org/bjnano/terms)

Appendix A

Positions and anisotropy of particles in the hcp-like cluster (particle's radius equal to 10 nm, distance *l* = 24 nm)

l := 24e−9

(0, 0, 0)
(*l* , 0, 0)
(−*l* , 0, 0)
(*l* /2, *l* *sqrt(3)/2, 0)
(*l* /2, −*l* *sqrt(3)/2, 0)
(−*l* /2, *l* *sqrt(3)/2, 0)
(−*l* /2, −*l* *sqrt(3)/2, 0)
(0, *l* *sqrt(3)/3, sqrt(2/3)**l*)
(*l* /2, −*l* *sqrt(3)/6, sqrt(2/3)**l*)
(−*l* /2, −*l* *sqrt(3)/6, sqrt(2/3)**l*)
(0, *l* *sqrt(3)/3, −sqrt(2/3)**l*)
(*l* /2, −*l* *sqrt(3)/6, −sqrt(2/3)**l*)
(−*l* /2, −*l* *sqrt(3)/6, −sqrt(2/3)**l*)

Axes need not be normalized.
(1, 0, 1) (0, 1, 0)
(1, 1, 1) (1, −1/2, −1/2)
(1, 0, 1) (0, 1, 0)
(1, 2, 3) (1, 1, −1)
(3, 2, 1) (0, 1, −2)
(2, 3, 1) (1, −2/3, 0)
(1, 4, 5) (3, −1/4, −2/5)
(1, 7, 8) (3, −1/7, −2/8)
(1, −1, 1) (−1/2, −1, −1/2)
(3, −4, 5) (2/3, 1, 2/5)
(1, 1, −2) (1, 1, 1)
(−1, 2, 1) (1, 1, −1)
(−5, 2, 3) (1, 1, 1)

Appendix B

Radii, positions, and anisotropy of nanoparticles in a random cluster.

8.5133e−9 (−3.0846e−9, −1.7535e−9, −7.4007e−9) (1, 0, 1) (0, 1, 0)
8.3496e−9 (7.1825e−9, −19.9597e−9, −3.8782e−9) (1, 1, 1) (1, −1/2, −1/2)
9.8094e−9 (−8.6111e−9, −13.8713e−9, 9.3346e−9) (1, 0, 1) (0, 1, 0)
7.2298e−9 (10.0964e−9, −3.0667e−9, 6.9356e−9) (1, 2, 3) (1, 1, −1)
5.1778e−9 (−4.2055e−9, 4.9178e−9, 8.3869e−9) (3, 2, 1) (0, 1, −2)
6.3302e−9 (15.1146e−9, −4.1237e−9, −9.2339e−9) (2, 3, 1) (1, −2/3, 0)
9.7173e−9 (1.5912e−9, 0.7839e−9, 26.0763e−9) (1, 4, 5) (3, −1/4, −2/5)
6.9621e−9 (10.3545e−9, 12.4256e−9, −3.1313e−9) (1, 7, 8) (3, −1/7, −2/8)
5.7563e−9 (−10.9109e−9, −18.0077e−9, −8.7378e−9) (1, −1, 1) (−1/2, −1, −1/2)
8.8459e−9 (−23.1353e−9, −5.1899e−9, −5.8510e−9) (3, −4, 5) (2/3, 1, 2/5)
7.7040e−9 (−8.3787e−9, −32.2892e−9, −0.6112e−9) (1, 1, −2) (1, 1, 1)
8.2230e−9 (−9.2265e−9, 17.2012e−9, −2.4037e−9) (−1, 2, 1) (1, 1, −1)
5.3401e−9 (9.0391e−9, 7.1572e−9, −17.5349e−9) (−5, 2, 3) (1, 1, 1)
9.8973e−9 (−28.5518e−9, −23.9300e−9, 5.0197e−9) (1, 1, 1) (0, −1/2, 1/2)
6.8875e−9 (23.5011e−9, −13.3713e−9, 2.9020e−9) (1, −1, 1) (1, 1, 0)
9.1581e−9 (−11.6570e−9, 18.6089e−9, 17.8719e−9) (3, 2, 3) (1/3, 1, −1)
9.4682e−9 (30.3120e−9, 4.7861e−9, −2.3089e−9) (5, −2, 1) (1, 2, −1)
7.3054e−9 (−3.6152e−9, −30.1619e−9, −18.0250e−9) (2, 3, 1) (1, −2/3, 0)
6.6458e−9 (18.5449e−9, −10.2883e−9, 19.8268e−9) (0, 4, 6) (0, −1/4, 1/6)
9.0936e−9 (−5.7759e−9, −11.7992e−9, −26.0763e−9) (1, 7, 8) (3, −3/7, 0)
8.3228e−9 (5.0384e−9, 27.5264e−9, 6.5725e−9) (0, −1, 1) (1, 1/3, 1/3)
5.1155e−9 (−3.6854e−9, 12.2949e−9, −18.0355e−9) (2, −4, 10) (−1, 2, 1)
6.8465e−9 (13.0048e−9, −15.1208e−9, −21.6364e−9) (−1, 1, −2) (−1, 1, 1)
8.5159e−9 (−24.5866e−9, 0.6522e−9, 15.5284e−9) (−1, 2, 0) (1, 1/2, −1)
9.2125e−9 (21.9143e−9, 20.9970e−9, −17.3203e−9) (−8, 2, 3) (1, 1, 2)
7.4695e−9 (8.3752e−9, −24.1503e−9, 14.7828e−9) (−5, 6, 1) (1, 1, −1)
8.9562e−9 (−30.3120e−9, 15.3687e−9, 0.1027e−9) (1, 0, 0) (0, 5/8, 3/7)
6.1754e−9 (7.6076e−9, −36.9465e−9, 3.2843e−9) (1, 0, 0) (0, 1, 0)
7.5434e−9 (21.6098e−9, −0.0787e−9, −25.5813e−9) (sqrt(3)/2, 1/2, 0) (0, 0, 1)
9.2026e−9 (−14.3286e−9, 36.9465e−9, 4.6108e−9) (1/2, 1/2, 0) (0, 0, 1)

Axes need not be normalized.
(1, 0, 1) (0, 1, 0)
(1, 1, 1) (1, −1/2, −1/2)
(1, 0, 1) (0, 1, 0)
(1, 2, 3) (1, 1, −1)
(3, 2, 1) (0, 1, −2)
(2, 3, 1) (1, −2/3, 0)
(1, 4, 5) (3, −1/4, −2/5)
(1, 7, 8) (3, −1/7, −2/8)
(1, −1, 1) (−1/2, −1, −1/2)

(3, −4, 5) (2/3, 1, 2/5)
(1, 1, −2) (1, 1, 1)
(−1, 2, 1) (1, 1, −1)
(−5, 2, 3) (1, 1, 1)
(1, 1, 1) (0, −1/2, 1/2)
(1, −1, 1) (1, 1, 0)
(3, 2, 3) (1/3, 1, −1)
(5, −2, 1) (1, 2, −1)
(2, 3, 1) (1, −2/3, 0)
(0, 4, 6) (0, −1/4, 1/6)
(1, 7, 8) (3, −3/7, 0)
(0, −1, 1) (1, 1/3, 1/3)
(2, −4, 10) (−1, 2, 1)
(−1, 1, −2) (−1, 1, 1)
(−1, 2, 0) (1, 1/2, −1)
(−8, 2, 3) (1, 1, 2)
(−5, 6, 1) (1, 1, −1)
(1, 0, 0) (0, 5/8, 3/7)
(1, 0, 0) (0, 1, 0)
(sqrt(3)/2, 1/2, 0) (0, 0, 1)
(1/2, 1/2, 0) (0, 0, 1)