# Comments and updated references to 'Modular Calabi-Yau threefolds'

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This file contains a list of updated and additional references, including some comments, to the book:

Meyer, Christian, *Modular Calabi-Yau threefolds*, Fields Institute Monograph **22** (2005), AMS, ISBN 0-8218-3908-X.

If you have any comments on the list, please contact the author via `cm.math@gmx.de`.

## 1 Updated references

The following papers are contained as preprints in the book's references. Meanwhile they have been published or accepted for publication. In addition, the URL of the Modular Forms Database ([97]) has changed (repeatedly).

[13] Bernardara, M., *Calabi–Yau complete intersections with infinitely many lines*, Rend. Sem. Mat. Univ. Pol. Torino **66**, no. 2 (2008), pp. 87–97.

[28] Cynk, S., Meyer, C., *Geometry and arithmetic of certain double octic Calabi–Yau manifolds*, Canadian Math. Bull. **48**, no. 2 (2005), pp. 180–194.

[30] Cynk, S., van Straten, D., *Infinitesimal deformations of double covers of smooth algebraic varieties*, Math. Nachr. **279**, no. 7 (2006), pp. 716–726.

[34] Dieulefait, L., *A modularity criterion for integral Galois representations and Calabi–Yau threefolds*, AMS/IP Studies in Advanced Mathematics "Mirror Symmetry V" (2006), Proceedings of the BIRS Workshop on Calabi-Yau Varieties and Mirror Symmetry, December 6-11, 2003, appendix to Hulek, K., Verrill, H. A., *On the modularity of Calabi–Yau threefolds containing elliptic ruled surfaces*, pp. 32–34.

[51] Hulek, K., Verrill, H. A., *On modularity of rigid and nonrigid Calabi–Yau varieties associated to the root lattice $A_4$*, Nagoya Math. Journal **179** (2005), pp. 103–146.

[52] Hulek, K., Verrill, H. A., *On the modularity of Calabi–Yau threefolds containing elliptic ruled surfaces*, AMS/IP Studies in Advanced Mathematics "Mirror Symmetry V" (2006), Proceedings of the BIRS Workshop on Calabi-Yau Varieties and Mirror Symmetry, December 6-11, 2003, pp. 19–31.

[55] Kimura, K., *A rational map between two threefolds*, AMS/IP Studies in Advanced Mathematics "Mirror Symmetry V" (2006), Proceedings of the BIRS Workshop on Calabi-Yau Varieties and Mirror Symmetry, December 6-11, 2003, pp. 87–88.

[64] Livné, R., Yui, N., *The modularity of certain non-rigid Calabi–Yau threefolds*, J. of Math. Kyoto Univ. **45**, no. 4 (2005), pp. 645–665.

[74] Mortenson, E., *Modularity of a Certain Calabi–Yau Threefold and Combinatorial Congruences*, Ramanujan Journal **11**, no. 1 (2006), pp. 5–39.

[89] Schütt, M., *On the modularity of three Calabi–Yau threefolds with bad reduction at 11*, Canadian Math. Bull. **49**, no. 2 (2006), pp. 296–312.

[97] Stein, W. A., *The Modular Forms Database* (2005), `https://wstein.org/Tables`.

[98] Top, J., van Geemen, B., *An isogeny of K3 surfaces*, Bull. London Math. Soc. **38** (2006), pp. 209–223.

[105] Wan, D., *Mirror Symmetry for Zeta Functions*, with an appendix by C. D. Haessig, AMS/IP Studies in Advanced Mathematics "Mirror Symmetry V" (2006), Proceedings of the BIRS Workshop on Calabi-Yau Varieties and Mirror Symmetry, December 6-11, 2003, pp. 159–184.

## 2 Additional references

Most of the following papers have appeared after the book was in print. Most of them are dealing with modularity of Calabi-Yau varieties in some way. For convenience, they are given reference numbers (starting with 113), but the numbers might change in case there are any more additions to the list.

The paper [146] is a classic. Only after publication of the book, I discovered that in this paper the family of $\Sigma_5$-symmetric quintic surfaces (cf. section 4.9) has been studied in detail. It is proved that the quintic surface $S_{(5:12)}$ is a singular model for the Hilbert modular surface corresponding to the congruence subgroup of level 2 in the extended Hilbert modular group for $\mathbb{Q}(\sqrt{13})$. This provides an explanation for the occurrence of the bad prime 13 in the $L$-series of the double octic $X_{(5:12)}$ constructed from $S_{(5:12)}$ and the Clebsch cubic. Furthermore, the surface $S_{(5:4)}$ corresponds to $\mathbb{Q}(\sqrt{21})$ in the same way. I do not know, however, how the bad prime 7 gets lost in the level of the $L$-series of the double octic $X_{(5:4)}$.

[113] Bini, G., van Geemen, B., *Geometry and Arithmetic of Maschke's Calabi-Yau Threefold*, Comm. in Number Theory and Physics **5**, no. 4 (2011), pp. 779–826.

[114] Brown, F., Schnetz, O., *Modular forms in quantum field theory*, Comm. in Number Theory and Physics **7**, no. 2 (2013), pp. 293–325.

[115] Burek, D., *Rigid realizations of modular forms in Calabi–Yau threefolds*, preprint (2017), arXiv: math.AG/1705.04059.

[116] Cynk, S., Kocel-Cynk, B., *Classification of double octic Calabi-Yau threefolds*, preprint (2016), arXiv: math.AG/1612.04364.

[117] Cynk, S., Freitag, E., Salvato Manni, R., *The geometry and arithmetic of a Calabi-Yau Siegel threefold*, International J. Math. **22**, no. 11 (2011), pp. 1585–1602.

[118] Cynk, S., Hulek, K., *Construction and examples of higher-dimensional modular Calabi-Yau manifolds*, Canadian Math. Bull. **50**, no. 4 (2007), pp. 486–503.

[119] Cynk, S., Meyer, C., *Modular Calabi-Yau threefolds of level eight*, International J. Math. **18**, no. 3 (2007), pp. 331–347.

[120] Cynk, S., Meyer, C., *Modularity of some non-rigid double octic Calabi-Yau threefolds*, Rocky Mountain J. Math. **38**, no. 6 (2008), pp. 1937–1958.

[121] Cynk, S., Schütt, M., *Generalised Kummer constructions and Weil restrictions*, J. Number Theory **129**, no. 8 (2009), pp. 1965–1975 .

[122] Cynk, S., Schütt, M., *A modular Calabi-Yau threefold with CM by* $\mathbb{Q}(\sqrt{-23})$, supplement to Cynk, S., Schütt, M., *Generalised Kummer constructions and Weil restrictions* (2009), `http://www.math.ku.dk/~mschuett/publik_en.php.html`

[123] Dieulefait, L., *Improvements on Dieulefait-Manoharmayum and applications*, preprint (2005), arXiv: math.NT/0508163.

[124] Dieulefait, L., *On the modularity of rigid Calabi-Yau threefolds: Epilogue*, Proceedings of the trimester on Diophantine Equations at the Hausdorff Institute, Zapiski POMI of the Steklov Math. Inst. St. Petersbourg **377** (2010), pp. 44–49, also in J. Math. Sciences. **171** (2010), pp. 725–727.

[125] Dieulefait, L., Pacetti, A., Schütt, M., *Modularity of the Consani-Scholten quintic. With an appendix by José Burgos Gil and Ariel Pacetti*, Doc. Math. **17** (2012), pp. 953–987.

[126] Elkies, N., Schütt, M., *Modular forms and K3 surfaces*, Adv. Math. **240**, no. 20 (2013), pp. 106–131.

[127] Fu, L., Wan, D., *Mirror congruence for rational points on Calabi-Yau varieties*, Asian J. Math. **10** (2006), pp. 1–10.

[128] Gouvêa, F., Kiming, I., Yui, N., *Quadratic twists of rigid Calabi-Yau threefolds over* $\mathbb{Q}$, in *Arithmetic and Geometry of K3 Surfaces and CalabiYau Threefolds*, eds. Laza, R., Schtt, M., Yui, N. (2013), Fields Institute Communications **67**, Springer, pp. 517–533.

[129] Gouvêa, F., Yui, N., *Rigid Calabi-Yau Threefolds over* $\mathbb{Q}$ *are Modular*, Expo. Math. **29**, no. 1 (2011), pp. 142–149.

[130] Hulek, K., Kloosterman, R., *The L-series of a cubic fourfold*, Manuscripta Math. **124**, no. 3 (2007), pp. 391–407.

[131] Hulek, K., Kloosterman, R., Schütt, M., *Modularity of Calabi-Yau varieties*, in *Global Aspects of Complex Geometry*, eds. Catanese, F., Esnault, H., Huckleberry, A., Hulek, K., Peternell, T. (2006), Springer, pp. 271–309.

[132] Hulek, K., Verrill, H. A., *On the motive of Kummer varieties associated to* $\Gamma_1(7)$ *- Supplement to the paper: The modularity of certain non-rigid Calabi-Yau threefolds (by R. Livné and N. Yui)*, J. of Math. Kyoto Univ. **45**, no. 4 (2005), pp. 667–681.

[133] Kapustka, G., Kapustka, M., *Modularity of a nonrigid Calabi–Yau manifold with bad reduction at 13*, Ann. Polon. Math. **90** (2007), pp. 89–98.

[134] Kapustka, M., *Correspondences between modular Calabi–Yau fiber products*, Manuscripta Math. **130**, no. 1 (2009), pp. 121–135.

[135] Lee, E., *A Modular Non-Rigid Calabi-Yau Threefold*, AMS/IP Studies in Advanced Mathematics "Mirror Symmetry V" (2006), Proceedings of the BIRS Workshop on Calabi-Yau Varieties and Mirror Symmetry, December 6-11, 2003, pp. 89–122.

[136] Lee, E., *A modular quintic Calabi-Yau threefold of level 55*,
Canad. J. Math. **63** (2011), pp. 616–633.

[137] Lee, E., *Update on Modular Non-Rigid Calabi-Yau Threefolds*, in *Modular Forms and String Duality* (2008), eds. Yui, N., Verrill, H., Doran, C.F., Fields Inst. Commun. Series, AMS, pp. 65–82.

[138] Logan, A., *New realizations of modular forms in CalabiYau threefolds arising from* $\phi^4$ *theory*, J. Number Theory **184**, no. 3 (2018), pp. 342–383 .

[139] Meyer, C., *The mirror quintic as a quintic*,
preprint (2005), arXiv: math.AG/0503329.

[140] Samol, K., van Straten, D., *Frobenius polynomials for Calabi-Yau equations*, Comm. in Number Theory and Physics **2**, no. 3 (2008), pp. 537–561.

[141] Schütt, M., *Arithmetic of a singular K3 surface*, Michigan Math. J. **56**, no. 3 (2008), pp. 513–527.

[142] Schütt, M., *Arithmetic of K3 surfaces*, Jahresbericht der DMV **111**, no. 1 (2009), pp. 23–41.

[143] Schütt, M., *CM newforms with rational coefficients*, Ramanujan Journal **19** (2009), pp. 187–205.

[144] Schütt, M., *Modularity of Maschke's octic and Calabi-Yau threefold*, Comm. in Number Theory and Physics **5**, no. 4 (2011), pp. 827–847.

[145] Schütt, M., Top, J., *Arithmetic of the [19,1,1,1,1,1] fibration*, Commentarii Mathematici Universitatis Sancti Pauli **55**, no. 1 (2006), pp. 9–16.

[146] Van der Geer, G., Zagier, D., *The Hilbert Modular Group for the Field* $\mathbb{Q}(\sqrt{13})$, Invent. Math. **42** (1977), pp. 93–133.

[147] Ward, M., *Arithmetic Properties of the Derived Category for Calabi-Yau Varieties*, thesis (2014), Univ. of Washington.

[148] Yang, L., *Galois representations arising from twenty-seven lines on a cubic surface and the arithmetic associated with Hessian polyhedra*, preprint (2006), arXiv: math.NT/0612383.

[149] Yui, N., *Modularity of Calabi-Yau Varieties: 2011 and Beyond*, in *Arithmetic and Geometry of K3 Surfaces and CalabiYau Threefolds*, eds. Laza, R., Schtt, M., Yui, N. (2013), Fields Institute Communications **67**, Springer, pp. 101–139.

[150] Wan, D., *Arithmetic mirror symmetry*, Quarterly Journal of Pure and Applied Math. **1**, no. 2 (2005), pp. 369–378.

[151] Zudilin, W., *A Hypergeometric Version of the Modularity of Rigid Calabi-Yau Manifolds*, preprint (2018), arXiv: math.NT/1805.00544.