The view from mathematics

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Astronomy, Astrophysics & High Energy Physics
Information Providers Summit IV

Harvard-Smithsonian Center for Astrophysics

15 March 2010

I am NOT here as a representative of the American Mathematical Society.

CV excerpts:

- TRLN copyright committee, mid-1980's
- Founded alg-geom branch of arXiv, 1992 (still on arXiv advisory board)
- Committee on Electronic Information and Communication of the International Mathematical Union, 1998–2006
- Daily user of SPIRES, arXiv, and MathSciNet

Mathematics is Different

- ▶ The citation half-life for the mathematics literature is relatively long (Emphasis on retrodigitization)
- ▶ The mathematics community has traditionally maintained a sharp distinction between the refereed literature and informal communication, and regards refereeing as adding significant value

Mathematics is Similar

- ▶ High arXiv penetration in certain subfields of mathematics; moderate in others
- ▶ Two extensive databases: Zentralblatt MATH and MathSciNet

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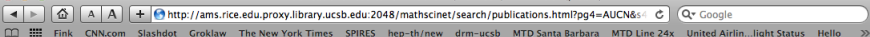- PDF HTML

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☐ **MR1191426 (94b:32035)** Morrison, David R. Picard-Fuchs equations and mirror maps for hypersurfaces. *Essays on mirror manifolds,* 241--264, *Int. Press, Hong Kong,* 1992. (Reviewer: Bruce Hunt) 32G20 (14D05 14J10 14J30 14N10 32J17) ▸ UC-eLinks
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☐ **MR0728142 (85j:14071)** Morrison, D. R. On $K3$ surfaces with large Picard number. *Invent. Math.* 75 (1984), no. 1, 105--121. (Reviewer: I. Dolgachev) 14J28 (14C30 14J05 14K10) ▸ UC-eLinks
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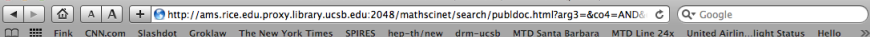
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Morrison, D. R.(1-PRIN)
On $K3$ surfaces with large Picard number.
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Let X be a complex algebraic surface of type $K3$ with Picard number $\rho \geq 19$. The author proves that the lattice T_X of transcendental cycles on X is isomorphic to the lattice of transcendental cycles on an abelian surface A. Moreover, this isomorphism is induced by a correspondence between X and A; there exists an involution on X whose quotient is the Kummer surface associated to A. Earlier, this result was proven by T. Shioda and H. Inose in the case $\rho=20$ [Complex analysis and algebraic geometry, 119--136, Iwanami Shoten, Tokyo, 1977; MR0441982 (56 #371)]. The same result is also true if $\rho=17$ [resp. $\rho=18$] if one assumes additionally that T_X contains the hyperbolic plane lattice U [resp. U^2] as an orthogonal complement. The proof of this result is based on V. V. Nikulin's work on the arithmetic of quadratic forms [Izv. Akad. Nauk SSSR Ser. Mat. 43 (1979), no. 1, 111--177; MR0525944 (80j:10031)]. It follows from this work that under the above assumptions on X, there exists an embedding of lattices $E_8(-1)^2 \hookrightarrow {\rm NS}(X)$. Another result of Nikulin together with the global Torelli theorem for $K3$ surfaces allows one to define an involution i on X. By an earlier work of Nikulin [ibid. Ser. Mat. 39 (1975), no. 2, 278--293; MR0429917 (55 #2926)] the quotient $Y=X/i$ is a Kummer surface. The paper also contains a nice survey of some of Nikulin's results together with some of their immediate applications to $K3$ surfaces. A remark added in proof explains that after applying a recent result of S. Mukai one can prove a more general result, conjectured earlier (in a weaker form) by T. Oda : Let X be an algebraic $K3$ surface such that there exists an embedding $(T_X \otimes {\bf Q}) \hookrightarrow (U^3 \otimes {\bf Q})$ of ${\bf Q}$-lattices. Then there exists an abelian surface A and a correspondence between X and A which induces a Hodge isometry $(T_X \otimes {\bf Q}) \simeq (T_A \otimes {\bf Q})$.
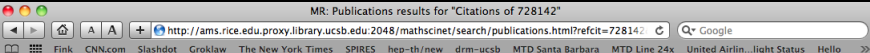
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☐ **MR2363136 (2008j:14070)** Garbagnati, Alice; Sarti, Alessandra Symplectic automorphisms of prime order on $K3$ surfaces. *J. Algebra* 318 (2007), no. 1, 323--350. (Reviewer: I. Dolgachev) 14J28 (14J50 52C07)
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☐ **MR2306633 (2008c:14052)** Mehran, Afsaneh Double covers of Kummer surfaces. *Manuscripta Math.* 123 (2007), no. 2, 205--235. (Reviewer: Paolo Stellari) 14J28
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☐ **MR2106484 (2005h:14092)** Long, Ling On Shioda-Inose structures of one-parameter families of $K3$ surfaces. *J. Number Theory* 109 (2004), no. 2, 299--318. (Reviewer: Noriko Yui) 14J28 (14J10 14J15)
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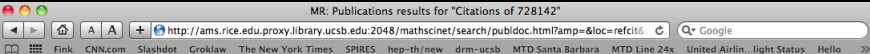
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☐ **MR2533769** Oguiso, Keiji A remark on dynamical degrees of automorphisms of hyperkähler manifolds. *Manuscripta Math.* 130 (2009), no. 1, 101–111. 53C26 (32Qxx)
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☐ **MR2524593** Macrì, Emanuele; Mehrotra, Sukhendu; Stellari, Paolo Inducing stability conditions. *J. Algebraic Geom.* 18 (2009), no. 4, 605–649. 14L30 (18E30)
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☐ **MR2508556** Schütt, Matthias Arithmetic of $K3$ surfaces. *Jahresber. Deutsch. Math.-Verein.* 111 (2009), no. 1, 23–41. (Reviewer: Lei Yang) 14J28 (11F23 11G15 11G25 11G35 14G05)
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☐ **MR2491607 (2010b:57042)** Nakamura, Nobuhiro Bauer-Furuta invariants under $\Bbb Z_2$-actions. *Math. Z.* 262 (2009), no. 1, 219–233. (Reviewer: Markus Szymik) 57R57 (55Q55 57M60 57S17)
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☐ **MR2467871 (2009i:14050)** Shioda, Tetsuji $K3$ surfaces and sphere packings. *J. Math. Soc. Japan* 60 (2008), no. 4, 1083–1105. (Reviewer: I. Dolgachev) 14J28 (14J27)
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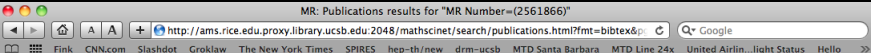| Citations	
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