

Dmitry Kaledin

A. Research Summary

Worked on homological aspects of non-commutative geometry, and specifically on Hochschild homology (Cartier operators, non-commutative Hodge-to-de Rham degeneration) and cohomology (Deligne Hochschild Cohomology conjecture, relation to the theory of braided categories and the notion of the Drinfeld double). Proved the conjecture of Kontsevich-Soibelman which claims that the Hochschild-to-cyclic, a.k.a. Hodge-to-de Rham spectral sequences degenerates for any smooth compact DG algebra A^* concentrated in non-negative degrees (preprint arXiv:math/0611623, final version of Fri, 30 Nov 2007). For the proof, developed and used a version of the Cartier isomorphism valid in the non-commutative setting, and the method of Deligne-Illusie of reduction to positive characteristic. Currently studying the relations between these results and the Topological Cyclic Homology theory. Also studying related structures on Hochschild cohomology in positive characteristic.

B. Articles

1. Kaledin, D. "Symplectic singularities from the Poisson point of view". *J. Reine Angew. Math.* 600 (2006), 135–156.
2. Kaledin, D.; Lehn, M.; Sorger, Ch. "Singular symplectic moduli spaces". *Invent. Math.* 164 (2006), no. 3, 591–614.
3. Kaledin, D. "On the coordinate ring of a projective Poisson scheme". *Math. Res. Lett.* 13 (2006), no. 1, 99–107.
4. Bezrukavnikov, R.; Kaledin, D. "Fedosov quantization in algebraic context". *Mosc. Math. J.* 4 (2004), no. 3, 559–592.
5. Bezrukavnikov, R. V.; Kaledin, D. B. "McKay equivalence for symplectic resolutions of quotient singularities". (Russian) *Tr. Mat. Inst. Steklova* 246 (2004), *Algebr. Geom. Metody, Svyazi i Prilozh.*, 20–42; translation in *Proc. Steklov Inst. Math.* 2004, no. 3 (246), 13–33.
6. Ginzburg, Victor; Kaledin, Dmitry "Poisson deformations of symplectic quotient singularities". *Adv. Math.* 186 (2004), no. 1, 1–57.
7. Kaledin, D. "On crepant resolutions of symplectic quotient singularities". *Selecta Math. (N.S.)* 9 (2003), no. 4, 529–555.

C. Talks

1. "Filtered derived categories and derivators", at "Algebraic Geometry and Commutative Algebra", Tokyo, University of Tokyo, Dec. 2007.
2. "Deligne Conjecture and the Drinfeld double", at "Categorical Aspects of Algebraic Geometry in Mirror Symmetry", Kyoto, RIMS, Dec. 2007.
3. "Del Pezzo surfaces and Non-commutative Geometry", at "Complex geometry in Osaka", in honor of A. Fujiki's 60-th birthday, Osaka, Nov. 2007.
4. "Non-commutative Hodge-to-de Rham degeneration and the non-commutative Cartier map", at Kinoshita annual algebraic geometry meeting, Oct. 2007.
5. "Tensor categories in Non-commutative Geometry", at "Categories in Geometry, Split, Croatia, Sep. 2007
6. "Deligne Conjecture and the Drinfeld double", at "Symplectic Geometry and Physics", Zürich, ETH, Sep. 2007.
7. "Cartier operators in Cyclic homology", at "Modular forms and Moduli Spaces", St. Petersburg, Russia, Euler Institute, Jul. 2007.
8. "Deligne Conjecture and the Drinfeld double", at "Workshop on Homological Mirror Symmetry and Applications II", Princeton, IAS, Mar. 2007.
9. "McKay correspondence in the Symplectic case", at "Generalized McKay Correspondences and Representation Theory", Berkeley, MSRI, Mar. 2006.
10. "Geometry and Topology of Symplectic Resolutions", 3 talks, at the AMS ten-yearly Algebraic Geometry Meeting, Seattle, Aug. 2005.

D. Lectures

1. "Homological methods in Non-Commutative Geometry", lecture course in the University of Tokyo, 11 lectures in 2007/08 on 16.10.07, 30.10.07, 06.11.07, 13.11.07, 20.11.07, 27.11.07, 10.12.07, 08.01.08, 15.01.08, 22.01.08, 29.01.08. Preliminary lecture notes available at <http://imperium.lenin.ru/~kaledin/math/tokyo/>.
2. "Beilinson Conjectures in the Non-Commutative setting", 2 lectures at the NATO Advanced study institute on finite fields, Goettingen, June 2007 (25.06.07 and 28.06.07).