Nicholas Addington
Title: New Derived Symmetries of some Hyperkaehler Varieties
We construct new autoequivalences of the derived categories of the Hilbert scheme of n points on a K3 surface and the variety of lines on a smooth cubic 4-fold. The second example and n=2 in the first use the theory of spherical functors; to deal with n>2 in the first example we develop a theory of P-functors. We conjecture that the same construction yields an autoequivalence for any moduli space of sheaves on a K3 surface.

Frederic Campana
Title: Symplectic manifolds as obstructions to the projectivity of compact Kaehler Manifolds
Abstract: The role of holomorphic two-forms as obstructions to projectivity of a compact Kaehler manifold X is since long well-known from a famous theorem of Kodaira. A Kaehler version of the minimal model program would imply that any such X should be (holomorphically) symplectic, or a torus, if 'simple' (which means: of dimension at least 2, and not covered by closed subvarieties of pure intermediate dimension). This would imply an extremely short decomposition of any such X in terms of Tori, symplectic, and projective manifolds.

Sergey Cherkis
Title: ALH Manifolds as Moduli Spaces
Abstract: We explore a number of examples of hyperkaehler manifolds of real dimension four and lower than quadratic volume growth. These are realized as moduli spaces of monopoles or as moduli spaces of vacua of five-dimensional quantum field theories. The moduli space realization of these spaces allows us to compute their asymptotic metrics and to study their relations to other hyperkaehler spaces.

Marco Gualtieri
Title: Generalized Kahler deformations

Abstract: TBA

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Nigel Hitchin

Title: The hyperholomorphic line bundle

Abstract: A hyperkahler manifold with a circle action preserving just one complex structure has associated with it a hyperholomorphic line bundle which forms the starting point for the HK/QK correspondence. The talk will give a description of this as a holomorphic bundle on twistor space, with particular reference to metrics on cotangent bundles and the moduli space of Higgs bundles.

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Daniel Huybrechts

Title: Quartic K3 surfaces vs. abelian tenfolds

Abstract: TBA

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Jun-Muk Hwang

Title: Webs of Lagrangian tori in projective symplectic manifolds

Abstract: This is a report on my jointwork with Richard Weiss, which proves that a web of Lagrangian fibration in a projective symplectic manifold defines an almost holomorphic map. There are two ingredients of the proof: a group-theoretic result on the behavior of the subgroups of the monodromy group associated to a web of submanifolds and an integrability result on pairs of Lagrangian foliations arising from proper Lagrangian fibrations.

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Dmitry Kaledin

Title: A canonical hyperkahler metric on the cotangent bundle
Abstract: We are going to describe a construction of a completely canonical hyperkahler metric on the neighborhood of the zero section in the cotangent bundle to a Kahler manifold. The construction is due independently to Birte Feix and myself, and it is actually 15 years old; however, in view of recent developments, perhaps it is worth revisiting.

Claude LeBrun

Title: Gravitational Instantons, Bubbling Modes, and the Geometrization of 4-Manifolds

Abstract: Given a smooth compact manifold, one would like to equip it with a Riemannian metric which is "as flat as possible," as measured by some natural curvature functional. Dimension 4 turns out to be completely exceptional for this class of problems, and phenomena that only occur in four dimensions play a dominant role in the resulting theory. This lecture will describe the way that complete, non-compact hyper-Kahler manifolds play a key role in this setting, via gluing in and bubbling off of gravitational instantons. I will also discuss the important role played by more general scalar-flat Kahler manifolds, and indicate some open problems related to the classification of such spaces.

Manfred Lehn

Title: Twisted cubics on a general cubic fourfolds

Abstract: I will report on work in progress with Christian Lehn, Christoph Sorger and Duco van Straten. Starting from the moduli space of twisted cubics on a general cubic fourfold we propose a construction of a family of 8-dimensional projective symplectic manifolds. The relation to Hilb^4 of a K3-surface is not yet completely clear.

Emanuele Macri

Title: MMP for moduli spaces of sheaves on K3 surfaces and Cone Conjectures

Abstract: We report on joint work in progress with A. Bayer on how one can use wall-crossing techniques to study the birational geometry of a moduli space M of Gieseker-stable sheaves on a K3 surface X. In particular:
(-) We will give a "modular interpretation" for all minimal models of $M$.
(-) We will describe the nef cone, the movable cone, and the effective cone
of $M$ in terms of the algebraic Mukai lattice of $X$.
(-) We will establish the so-called Tyurin/Bogomolov/Hassett-Tschinkel/
Huybrechts/Sawon
Conjecture on the existence of Lagrangian fibrations on $M$.

Laurent Manivel
Title: Fano fourfolds and EPW sextics.
Abstract: The Fano variety of lines on a cubic fourfold is
well-known to be a holomorphic symplectic variety, by the
classical work of Beauville and Donagi. There is a similar
construction, starting from a Fano fourfold of degree ten,
that yields a double EPW sextic: another famous example of
holomorphic symplectic variety, first discovered by Mukai and
O'Grady. I will discuss the many facets of this construction,
including the unexpected fact that the derived category of
a Fano fourfold of degree ten contains a two-dimensional
Calabi-Yau sub-category.

Dmitri Markouchevitch
Title: Compactifying Lagrangian fibrations
Abstract: In the talk I will speak on recent advancements in the problem of
compactification of Lagrangian fibrations in intermediate Jacobians of Fano
threefolds.

Daisuke Matsushita
Title: On isotropic divisors of the Hilbert scheme of K3 surfaces
Abstract: Let $X$ be the Hilbert scheme of a K3 surface parametrizing length
$n$ scheme and $L$ an isotropic divisor on $X$. If $n$ is greater than 5, $n-1$ is
odd and $n-1$ has no square factors, then there exists a projective
irreducible symplectic manifold $X'$ which is birational to $X$ and the proper
transform $L'$ of $L$ is free. Moreover $L'$ defines a Lagrangian fibration over
the projective space which is deformation equivalent to the compactification
Jacobian of the linear system on K3 surface.

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Gregory Moore

Title: BPS Degeneracies and Hyperkahler Geometry

Abstract: Part 1:
Given a Higgs bundle on a Riemann surface C the method of spectral networks allows one to derive a set of BPS degeneracies, satisfying the 2d4d wall-crossing formula - a version of the Kontsevich-Soibelman wall-crossing formula. Using this data as input in a system of integral equations one can construct explicit solutions to the Hitchin equations on C, together with the hyperkahler metric on the moduli space of solutions to the Hitchin equations.

Part 2:
The semiclassical description of the same BPS degeneracies involves zeromodes of Dirac operators on monopole moduli spaces, and therefore we learn about L2-harmonic spinors on these spaces.

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Yoshinori Namikawa

Title: Symplectic varieties of complete intersection and contact geometry

Abstract:
Let $(X, \omega)$ be a singular affine symplectic variety embedded in an affine space as a complete intersection of homogeneous polynomials. Assume moreover that $\omega$ is also homogeneous. Then $(X, \omega)$ is isomorphic to the nilpotent variety $(N, \omega_{KK})$ of a semisimple complex Lie algebra $g$ together with the Kostant-Kirillov form $\omega_{KK}$.

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Keiji Oguiso

Title: No cohomologically trivial non-trivial automorphism of generalized Kummer manifold

Abstract: We prove that the natural representaion, on the total Betti cohomolgy group, of the automorphism group of a hyperkahler manifold deformation equivalent to a generalized Kummer manifold is faithful.
Besides its own interest in hyperkaehler geometry, this is much inspired by a question of Professor Dusa McDuff, while the result is an answer in negative direction.

Daniel Persson

Title: Wall-crossing and the QK/HK correspondence

Abstract: The QK/HK correspondence relates a quaternion-Kahler manifold M with a circle isometry→ to a hyperkahler manifold M' of the same real dimension and with a different circle action. The correspondence furthermore ensures that M' comes equipped with a hyperholomorphic line bundle. I will describe a physical realization of this correspondence in the context of Calabi-Yau compactifications of string theory. A key role in the construction is played by the (motivic) Kontsevich-Soibelman wall-crossing formula and the twistorial descriptions of hyperkahler and quaternion-Kahler manifolds.

Yuri Tschinkel

Title: "Arithmetic aspects of K3 surfaces and their higher-dimensional analogs".

Abstract: I will discuss some arithmetic questions that arise in the study of K3 surfaces (joint with B. Hassett).

Misha Verbitsky

Title: Local structure of twistor spaces

Abstract: Let M be a hyperkahler manifold, and Tw(M) its twistor space, fibered over CP^1. Consider a section S of this fibration, that is, a rational curve, isomorphically projecting to CP^n, and let U be the tubular neighbourhood of S inside Tw(M). For any holomorphic line bundle bundle L on Tw(M), the space $\Gamma(U(L))$ of sections of L on U is finite-dimensional. I prove that $\Gamma(U(L))$ is in fact independent from the choice of S and U. This allows us to define "the Moishezon structure" on the twistor space.
The twistor spaces for manifolds obtained by hyperkahler reduction (such as quiver varieties) are Moishezon, and the twistor spaces for compact hyperkahler manifolds are not Moishezon.

Claire Voisin
Title: Chow groups of K3 surfaces and hyper-Kaehler manifolds

Abstract: A few years ago, Beauville and myself proved that an algebraic K3 surface $S$ carries a canonical 0-cycle (defined modulo rational equivalence) satisfying very restrictive properties (it is proportional to the second Chern class of $S$, and to the intersection of any two divisors on $S$). This 0-cycle appeared recently in works of Huybrechts who showed that if $S$ has Picard rank at least 2, the second Chern class of any rigid vector bundle on $S$ is also a multiple of this cycle. I will give a new characterization of this 0-cycle which implies easily that the last result holds without any assumption on the Picard number. I will also explain recent ideas of O'Grady generalizing the statements above.

Kota Yoshioka
Title: Moduli of stable sheaves on abelian surfaces.

Abstract: I will explain that Bridgeland stability condition is useful to study the moduli of stable sheaves on abelian surfaces.